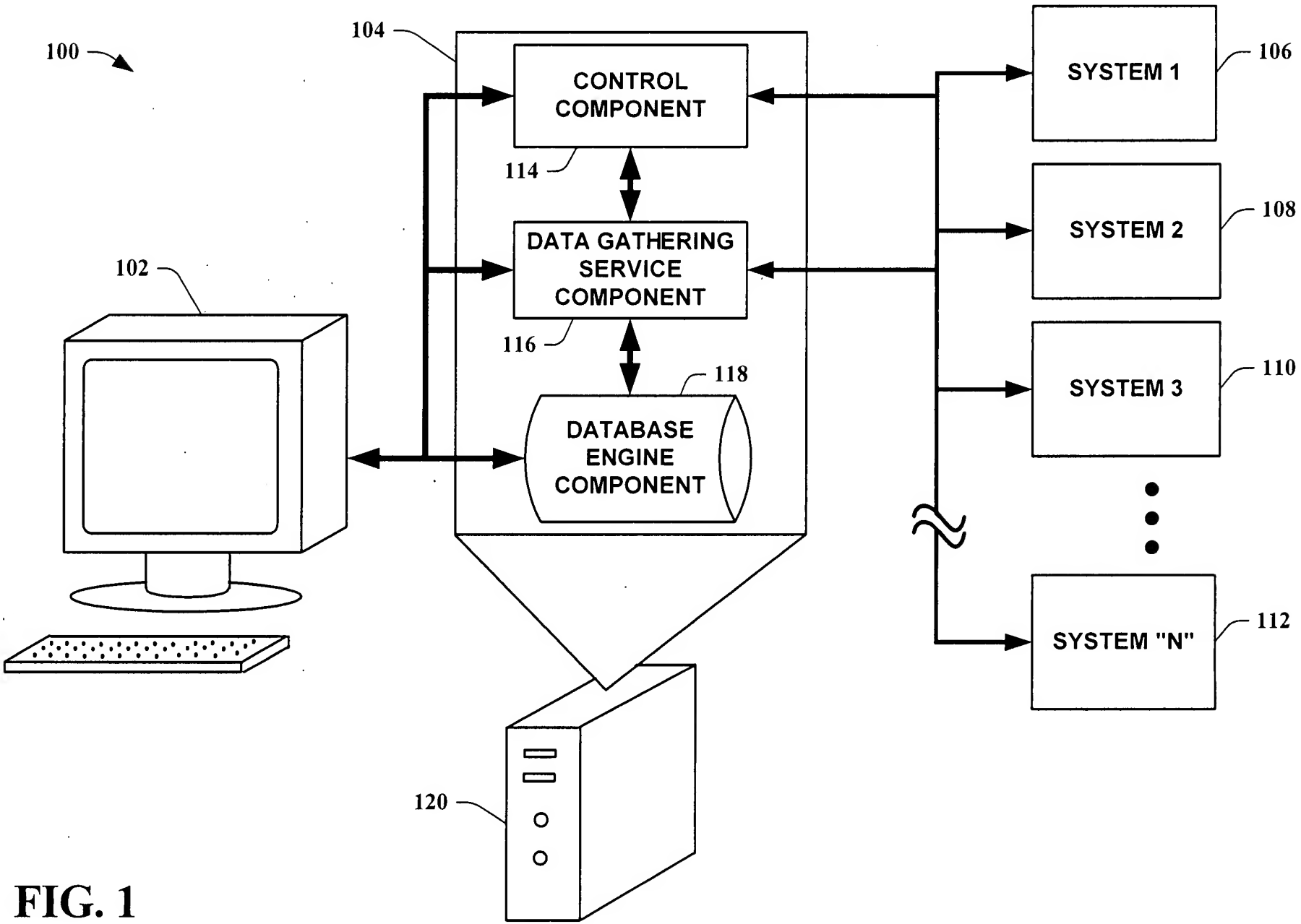

100
104
CONTROL COMPONENT
114
DATA GATHERING SERVICE COMPONENT
116
118
DATABASE ENGINE COMPONENT
102
120
SYSTEM 1
106
SYSTEM 2
108
SYSTEM 3
110
SYSTEM "N"
112

FIG. 1

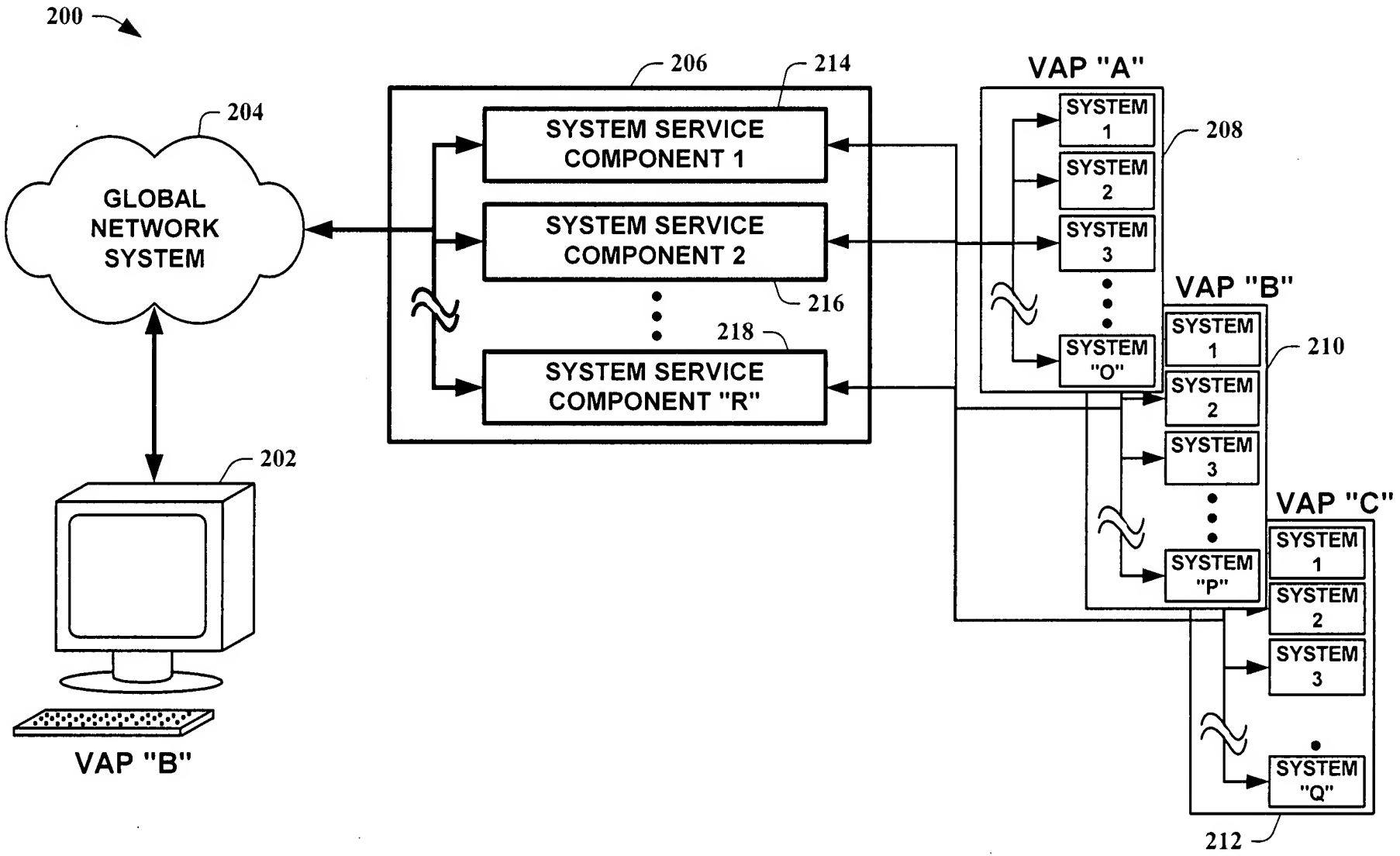

200
206
214
204
GLOBAL NETWORK SYSTEM
SYSTEM SERVICE COMPONENT 1
SYSTEM SERVICE COMPONENT 2
216
218
SYSTEM SERVICE COMPONENT "R"
202
VAP "B"
VAP "A"
SYSTEM 1
SYSTEM 2
SYSTEM 3
SYSTEM "O"
208
VAP "B"
SYSTEM 1
SYSTEM 2
SYSTEM 3
SYSTEM "P"
210
VAP "C"
SYSTEM 1
SYSTEM 2
SYSTEM 3
SYSTEM "Q"
212

FIG. 2

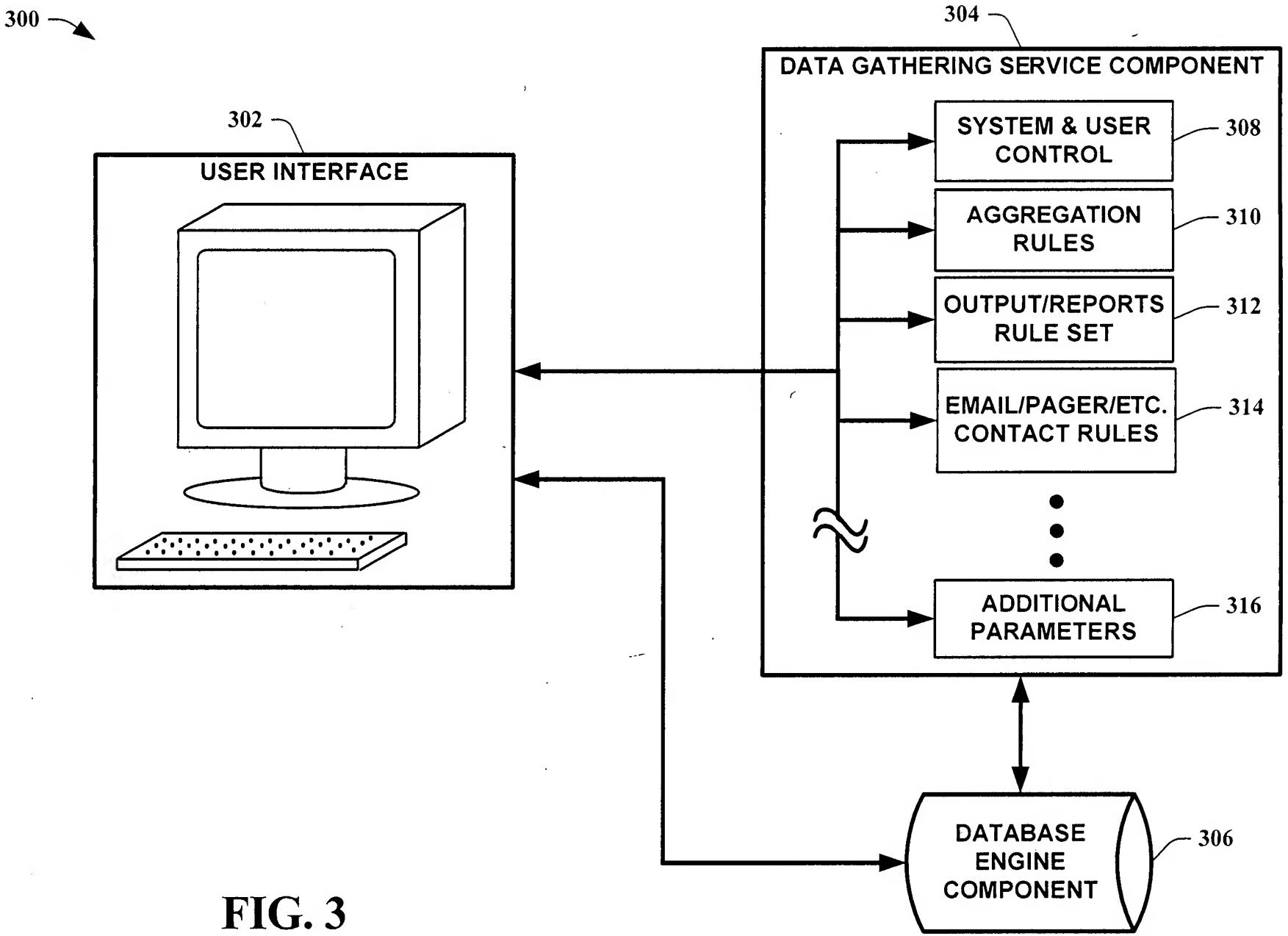

300
304
DATA GATHERING SERVICE COMPONENT
302
USER INTERFACE
SYSTEM & USER CONTROL
308
AGGREGATION RULES
310
OUTPUT/REPORTS RULE SET
312
EMAIL/PAGER/ETC. CONTACT RULES
314
ADDITIONAL PARAMETERS
316
DATABASE ENGINE COMPONENT
306

FIG. 3

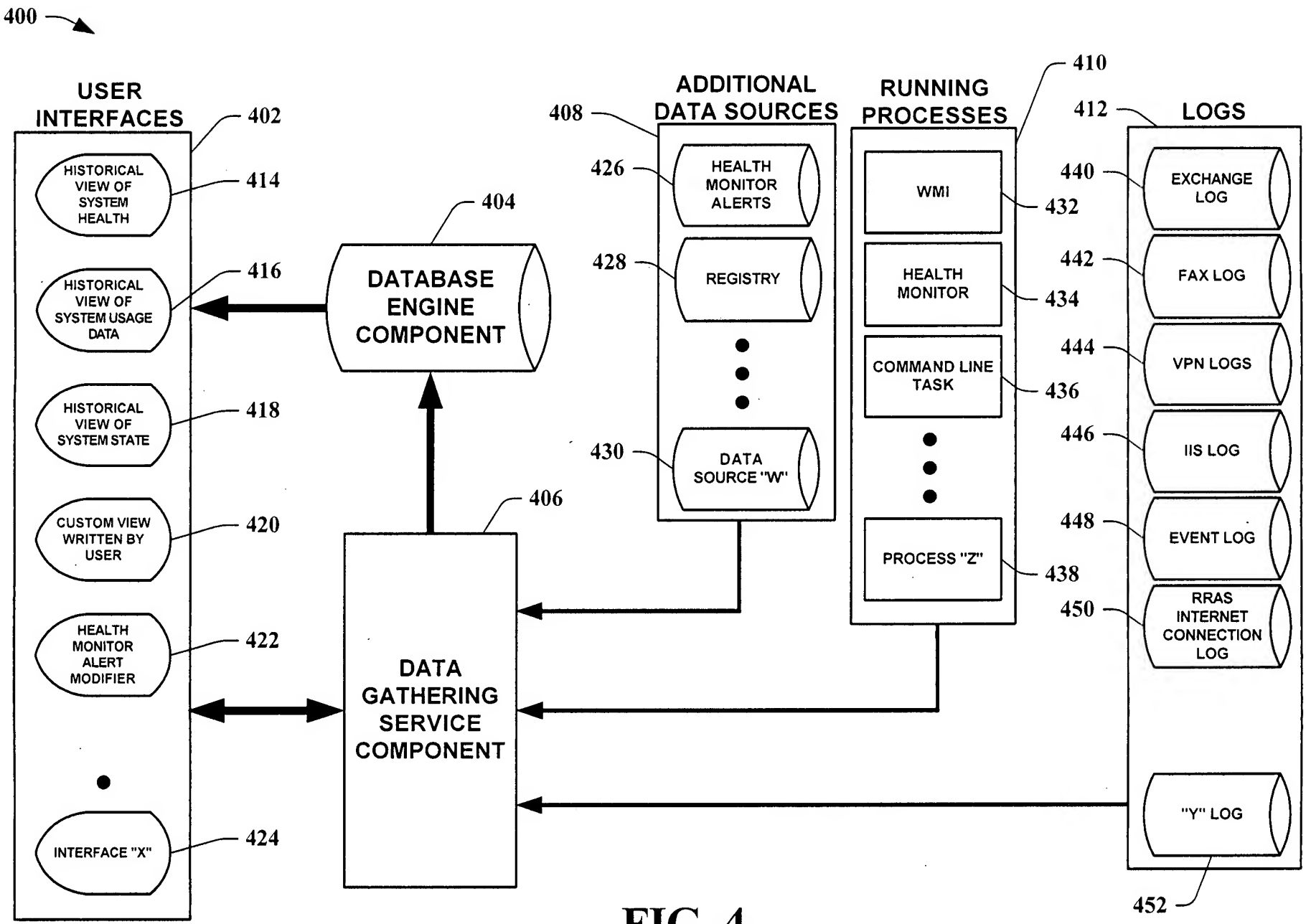

400
USER INTERFACES
402
HISTORICAL VIEW OF SYSTEM HEALTH
414
HISTORICAL VIEW OF SYSTEM USAGE DATA
416
HISTORICAL VIEW OF SYSTEM STATE
418
CUSTOM VIEW WRITTEN BY USER
420
HEALTH MONITOR ALERT MODIFIER
422
INTERFACE "X"
424
404
DATABASE ENGINE COMPONENT
406
DATA GATHERING SERVICE COMPONENT
ADDITIONAL DATA SOURCES
408
HEALTH MONITOR ALERTS
426
REGISTRY
428
DATA SOURCE "W"
430
RUNNING PROCESSES
410
WMI
432
HEALTH MONITOR
434
COMMAND LINE TASK
436
PROCESS "Z"
438
LOGS
412
EXCHANGE LOG
440
FAX LOG
442
VPN LOGS
444
IIS LOG
446
EVENT LOG
448
RRAS INTERNET CONNECTION LOG
450
"Y" LOG
452

FIG. 4

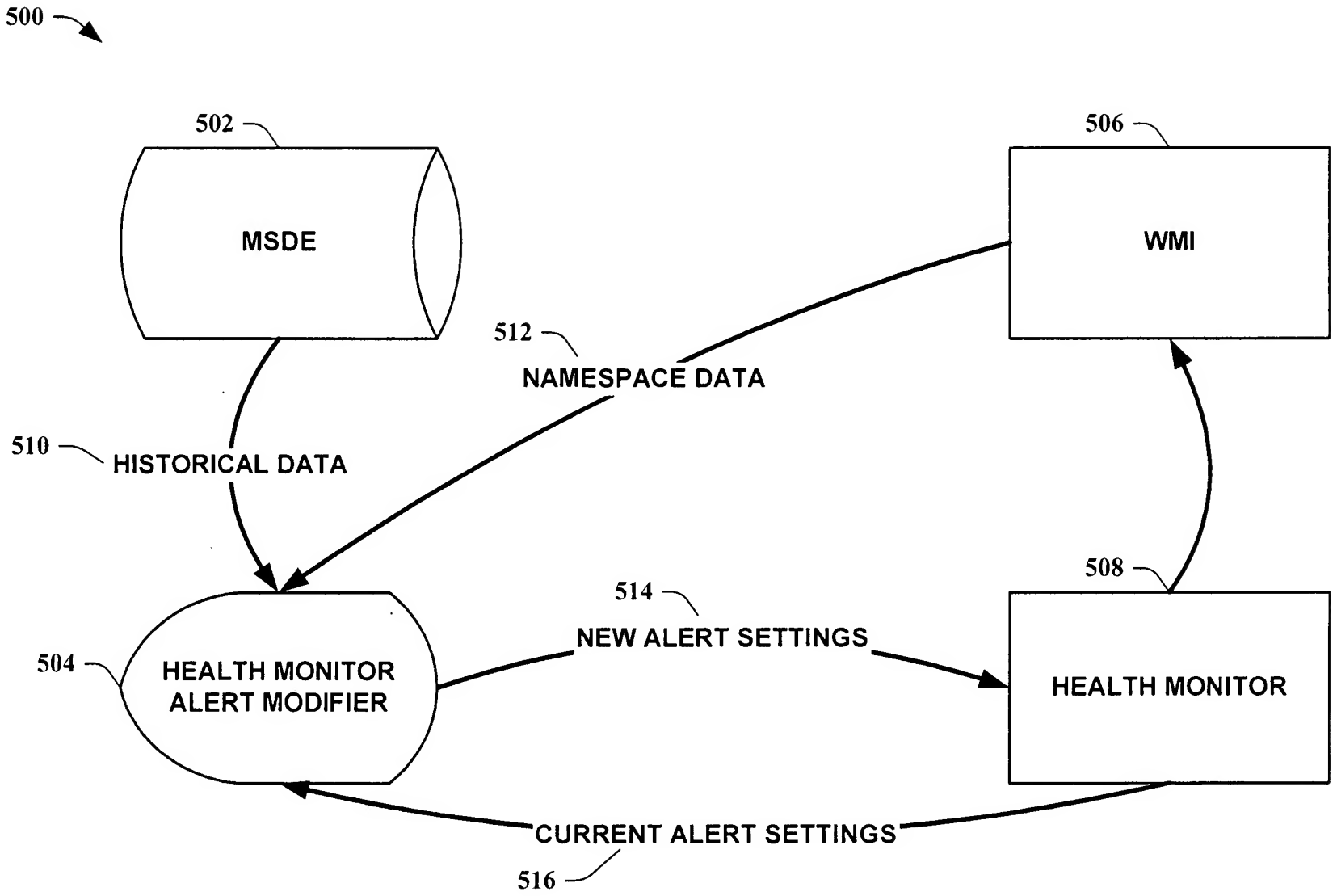

500
502
MSDE
506
WMI
512
NAMESPACE DATA
510
HISTORICAL DATA
508
514
NEW ALERT SETTINGS
504
HEALTH MONITOR
ALERT MODIFIER
HEALTH MONITOR
CURRENT ALERT SETTINGS
516

FIG. 5

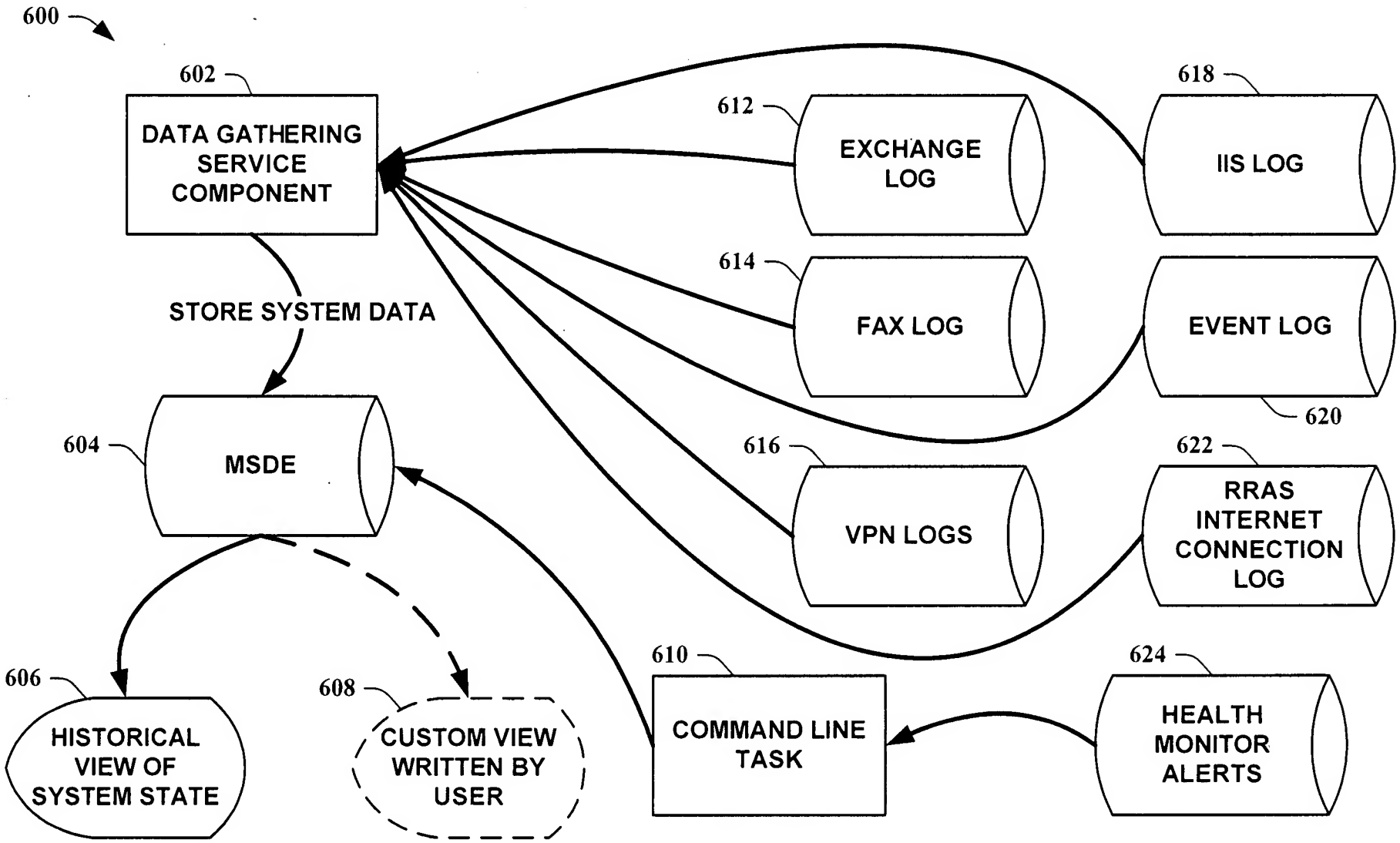

600
602
DATA GATHERING SERVICE COMPONENT
STORE SYSTEM DATA
604
MSDE
606
HISTORICAL VIEW OF SYSTEM STATE
608
CUSTOM VIEW WRITTEN BY USER
610
COMMAND LINE TASK
612
EXCHANGE LOG
614
FAX LOG
616
VPN LOGS
618
IIS LOG
620
EVENT LOG
622
RRAS INTERNET CONNECTION LOG
624
HEALTH MONITOR ALERTS

FIG. 6

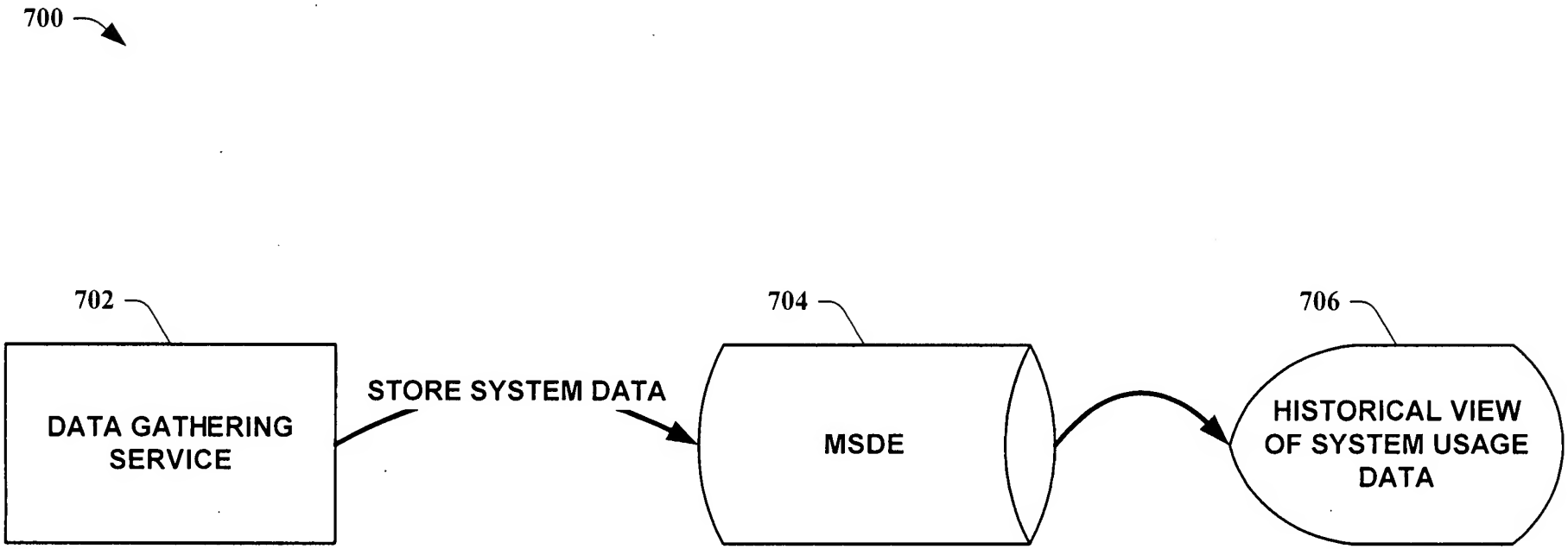

700
702
DATA GATHERING SERVICE
STORE SYSTEM DATA
704
MSDE
706
HISTORICAL VIEW OF SYSTEM USAGE DATA

FIG. 7

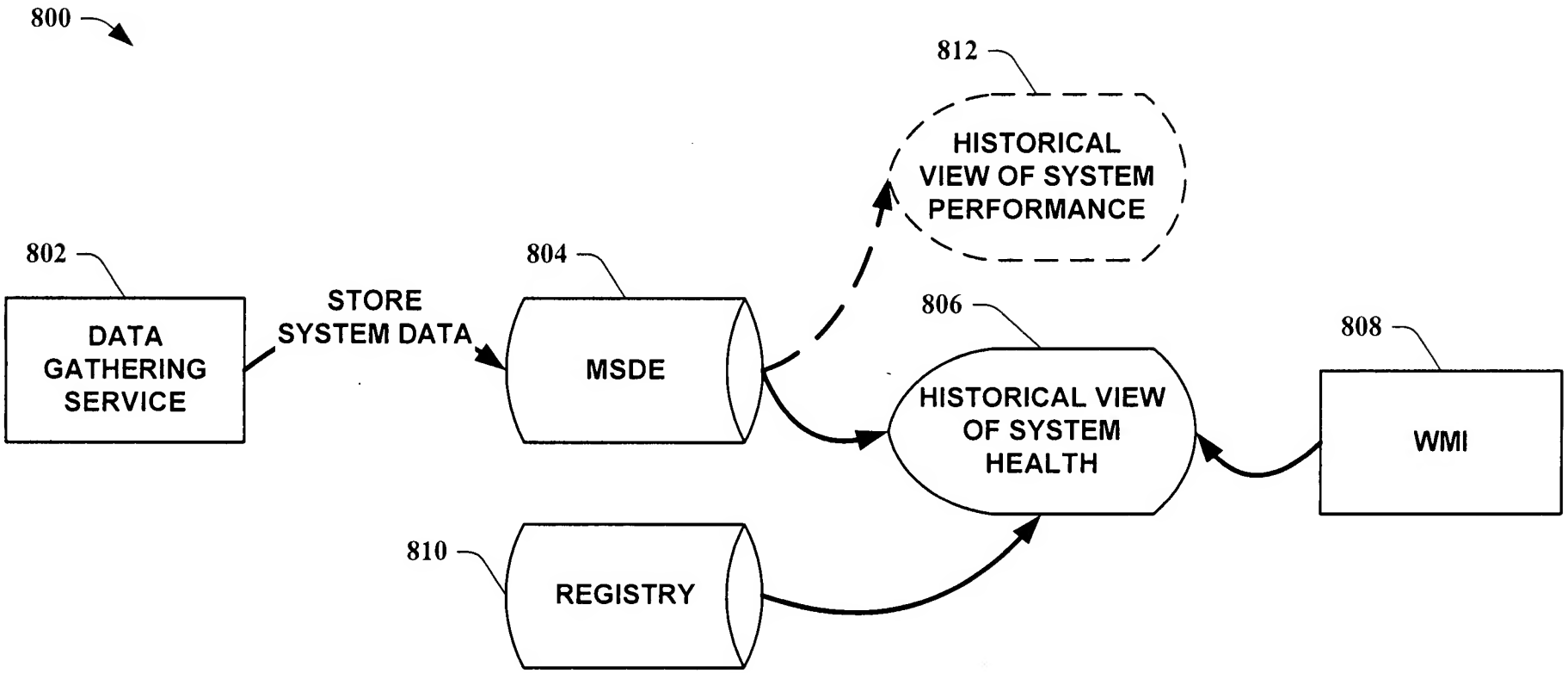

800
812
HISTORICAL VIEW OF SYSTEM PERFORMANCE
802
DATA GATHERING SERVICE
STORE SYSTEM DATA
804
MSDE
806
HISTORICAL VIEW OF SYSTEM HEALTH
808
WMI
810
REGISTRY

FIG. 8

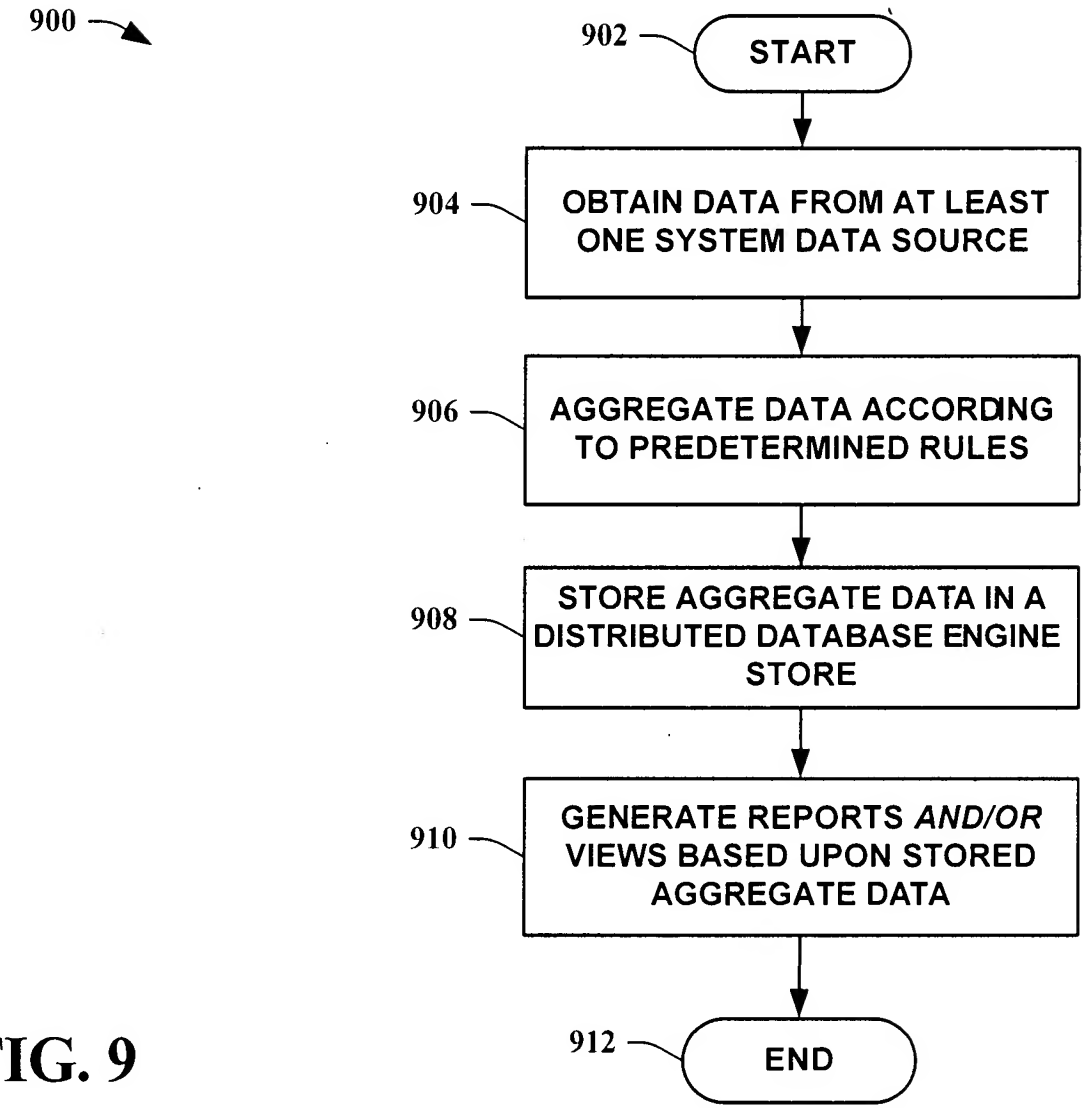

900
902
START
904
OBTAIN DATA FROM AT LEAST ONE SYSTEM DATA SOURCE
906
AGGREGATE DATA ACCORDING TO PREDETERMINED RULES
908
STORE AGGREGATE DATA IN A DISTRIBUTED DATABASE ENGINE STORE
910
GENERATE REPORTS *AND/OR* VIEWS BASED UPON STORED AGGREGATE DATA
912
END

FIG. 9

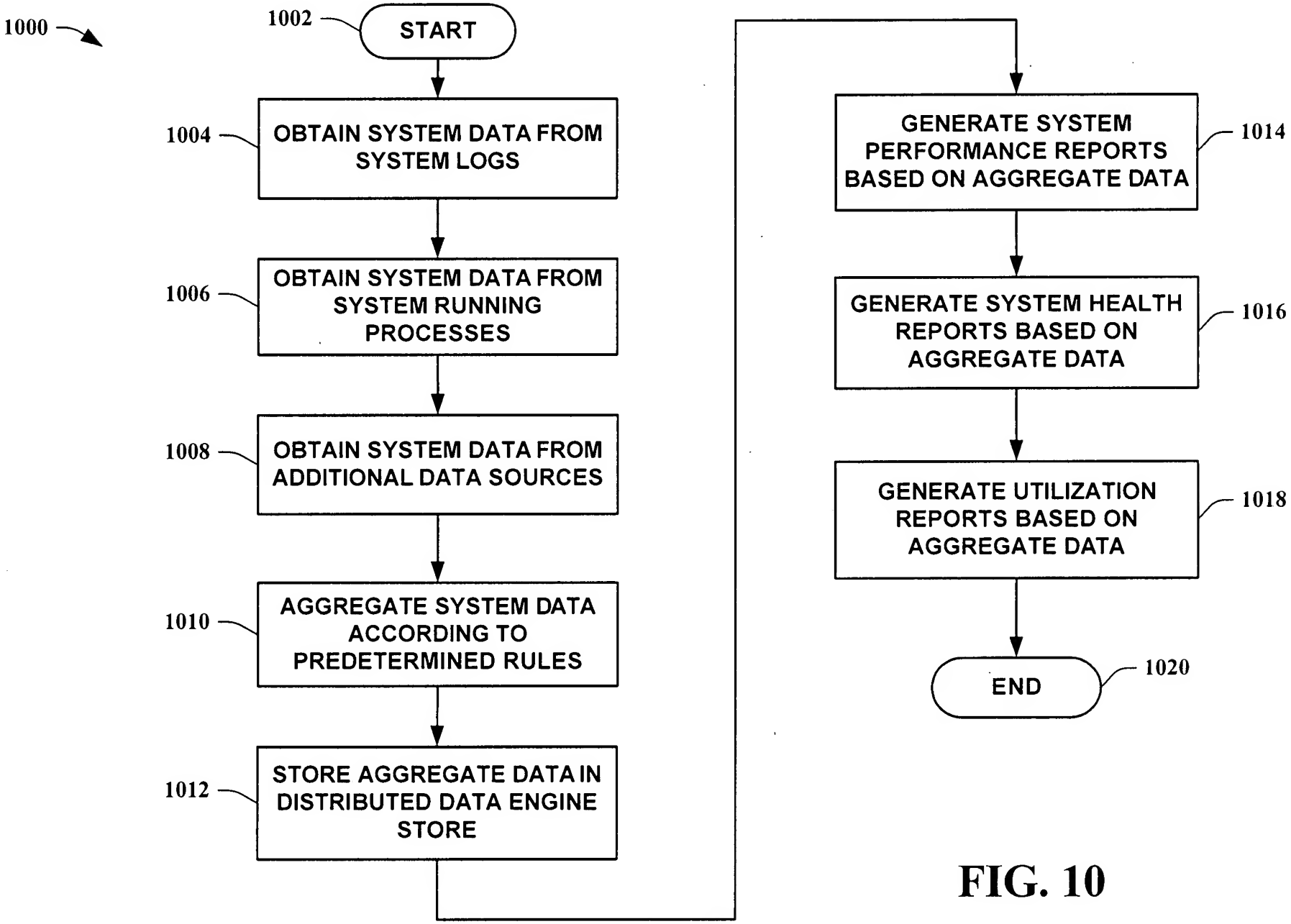

1000
1002
START
1004
OBTAIN SYSTEM DATA FROM SYSTEM LOGS
1006
OBTAIN SYSTEM DATA FROM SYSTEM RUNNING PROCESSES
1008
OBTAIN SYSTEM DATA FROM ADDITIONAL DATA SOURCES
1010
AGGREGATE SYSTEM DATA ACCORDING TO PREDETERMINED RULES
1012
STORE AGGREGATE DATA IN DISTRIBUTED DATA ENGINE STORE
1014
GENERATE SYSTEM PERFORMANCE REPORTS BASED ON AGGREGATE DATA
1016
GENERATE SYSTEM HEALTH REPORTS BASED ON AGGREGATE DATA
1018
GENERATE UTILIZATION REPORTS BASED ON AGGREGATE DATA
1020
END

FIG. 10

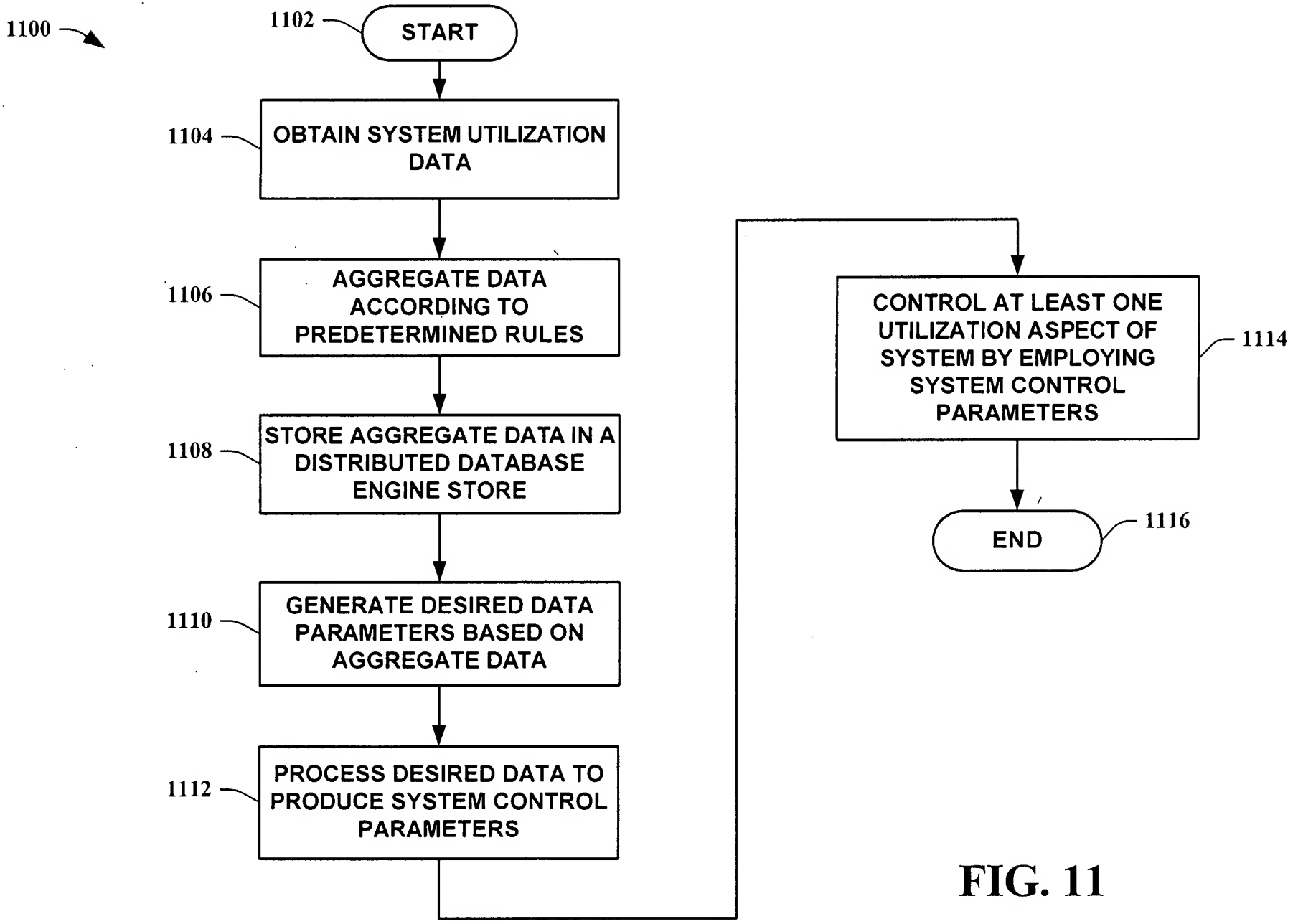

1100
1102
START
1104
OBTAIN SYSTEM UTILIZATION DATA
1106
AGGREGATE DATA ACCORDING TO PREDETERMINED RULES
1108
STORE AGGREGATE DATA IN A DISTRIBUTED DATABASE ENGINE STORE
1110
GENERATE DESIRED DATA PARAMETERS BASED ON AGGREGATE DATA
1112
PROCESS DESIRED DATA TO PRODUCE SYSTEM CONTROL PARAMETERS
1114
CONTROL AT LEAST ONE UTILIZATION ASPECT OF SYSTEM BY EMPLOYING SYSTEM CONTROL PARAMETERS
1116
END

FIG. 11

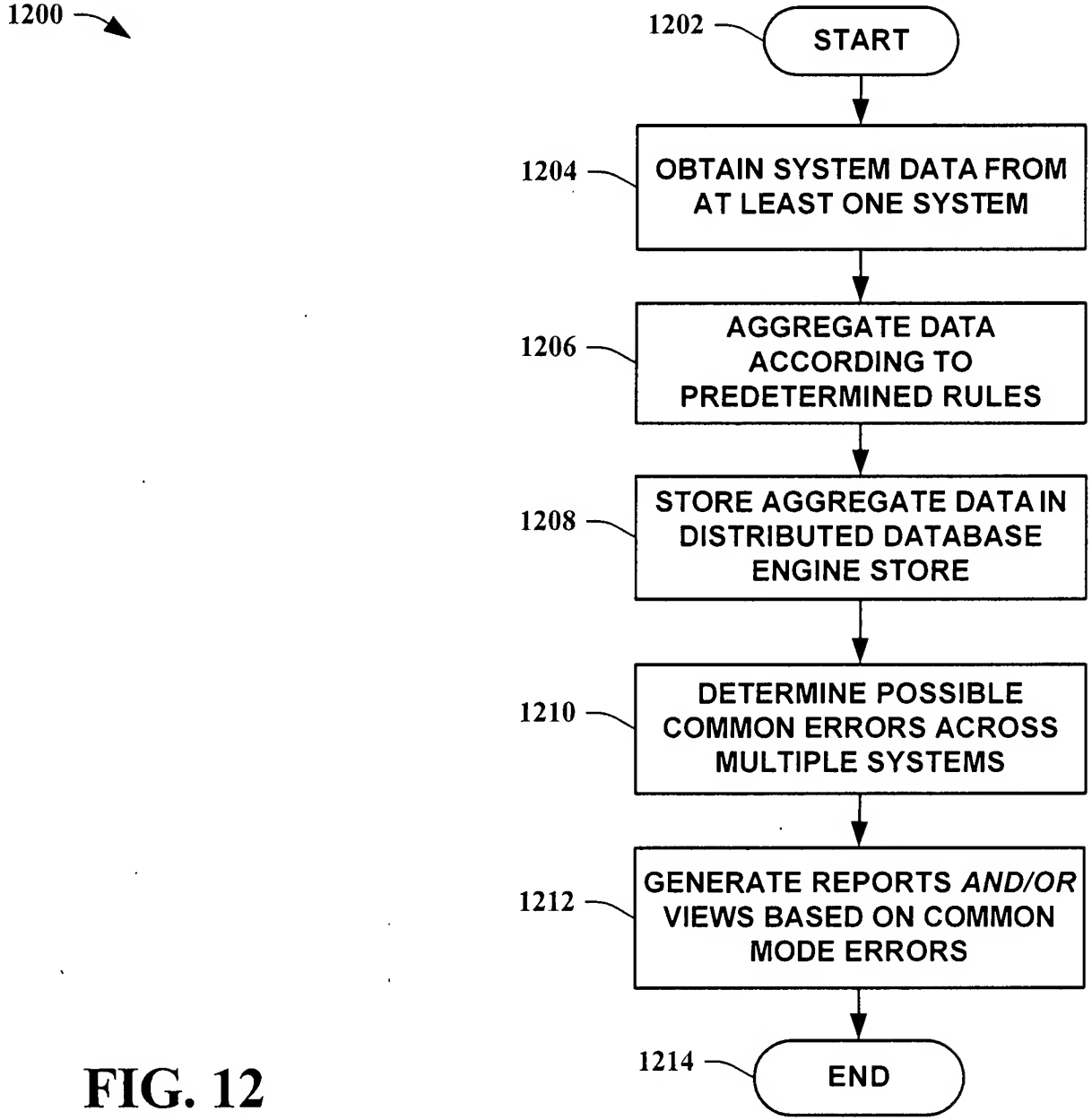

1200
1202
START
1204
OBTAIN SYSTEM DATA FROM AT LEAST ONE SYSTEM
1206
AGGREGATE DATA ACCORDING TO PREDETERMINED RULES
1208
STORE AGGREGATE DATA IN DISTRIBUTED DATABASE ENGINE STORE
1210
DETERMINE POSSIBLE COMMON ERRORS ACROSS MULTIPLE SYSTEMS
1212
GENERATE REPORTS *AND/OR* VIEWS BASED ON COMMON MODE ERRORS
1214
END

FIG. 12

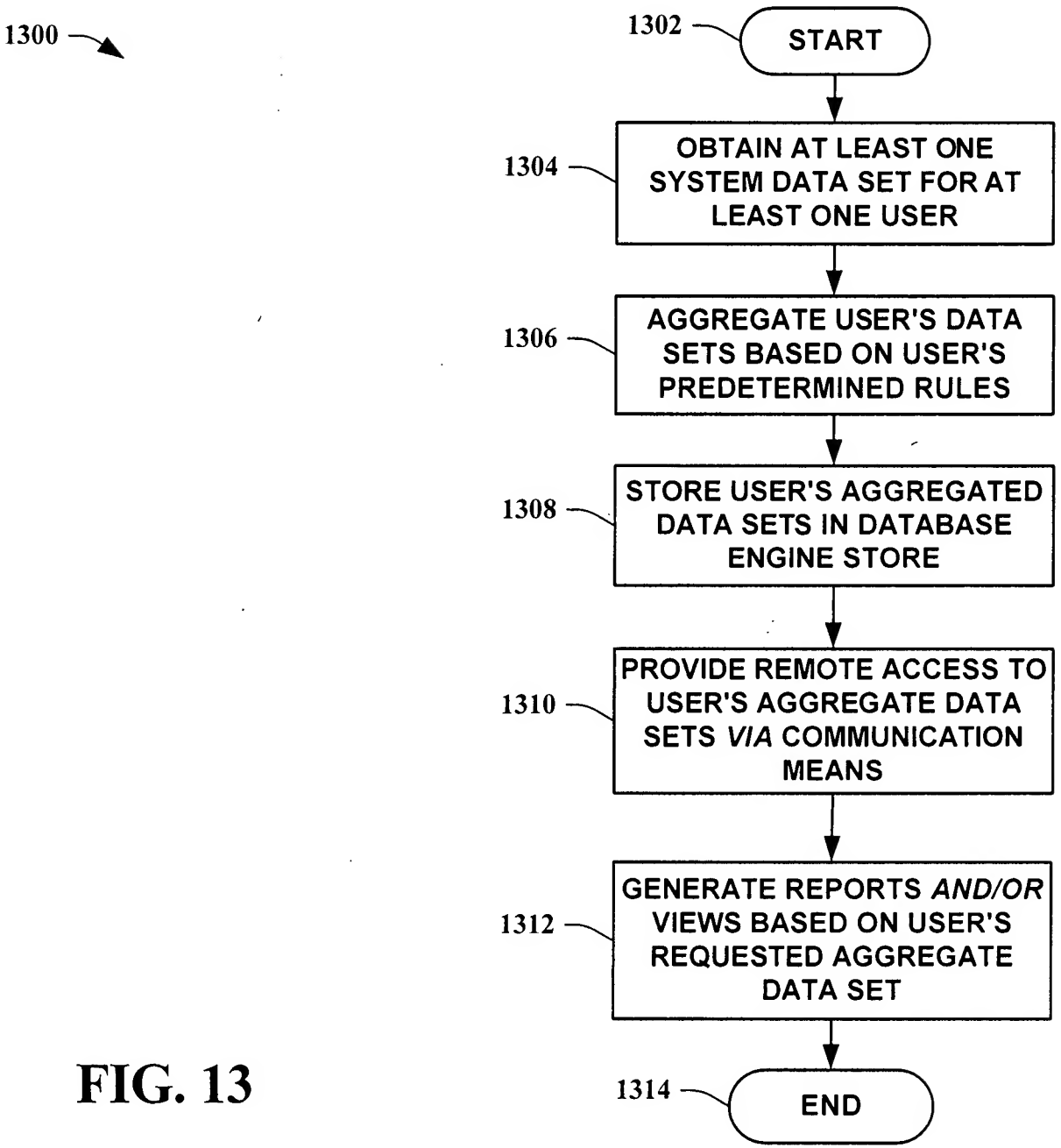

1300
1302
START
1304
OBTAIN AT LEAST ONE SYSTEM DATA SET FOR AT LEAST ONE USER
1306
AGGREGATE USER'S DATA SETS BASED ON USER'S PREDETERMINED RULES
1308
STORE USER'S AGGREGATED DATA SETS IN DATABASE ENGINE STORE
1310
PROVIDE REMOTE ACCESS TO USER'S AGGREGATE DATA SETS *VIA* COMMUNICATION MEANS
1312
GENERATE REPORTS *AND/OR* VIEWS BASED ON USER'S REQUESTED AGGREGATE DATA SET
1314
END

FIG. 13

1400

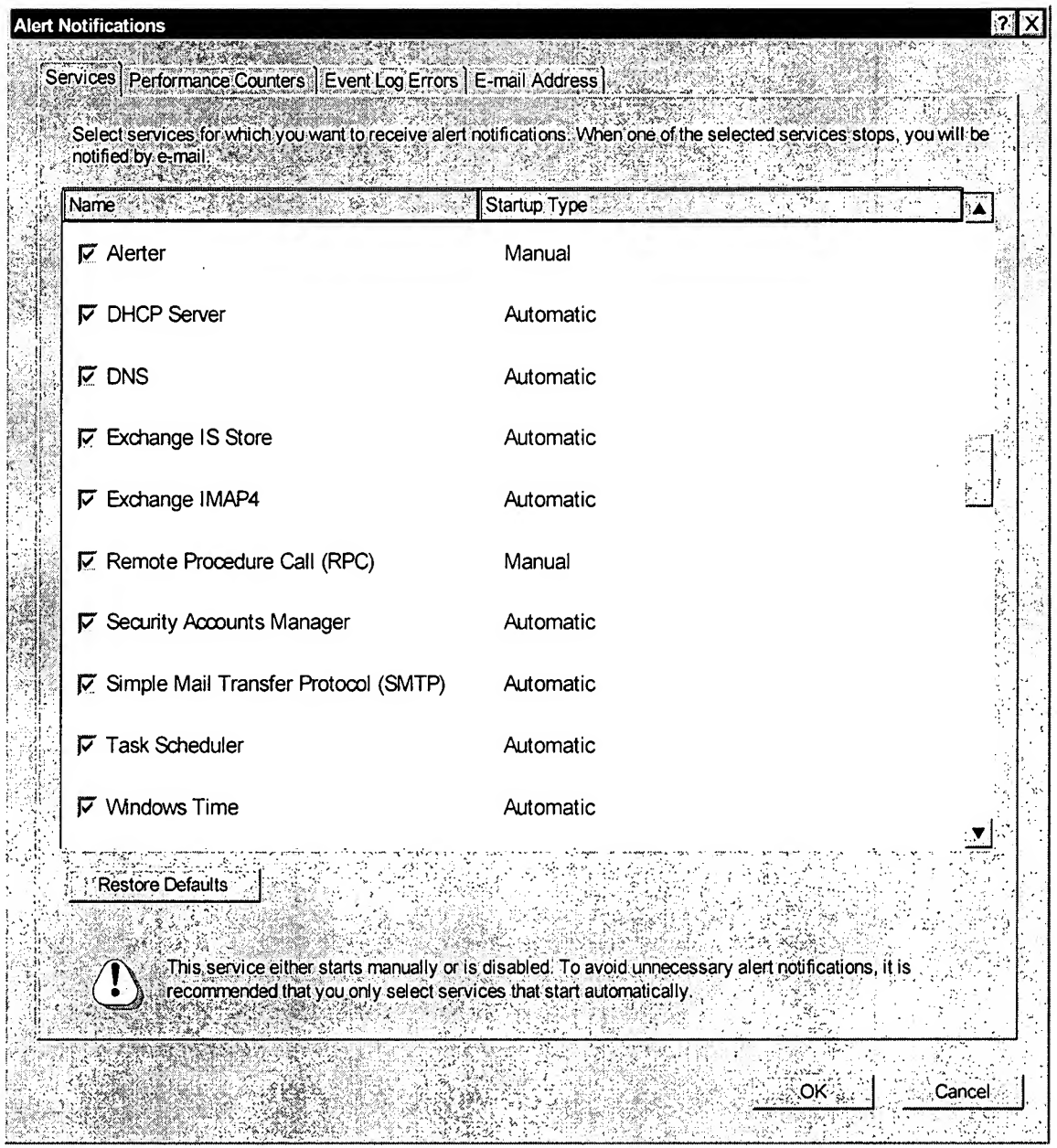

Alert Notifications
Services
Performance Counters
Event Log Errors
E-mail Address
Select services for which you want to receive alert notifications. When one of the selected services stops, you will be notified by e-mail.
Name
Startup Type
Alerter
Manual
DHCP Server
Automatic
DNS
Automatic
Exchange IS Store
Automatic
Exchange IMAP4
Automatic
Remote Procedure Call (RPC)
Manual
Security Accounts Manager
Automatic
Simple Mail Transfer Protocol (SMTP)
Automatic
Task Scheduler
Automatic
Windows Time
Automatic
Restore Defaults
This service either starts manually or is disabled. To avoid unnecessary alert notifications, it is recommended that you only select services that start automatically.
OK
Cancel

FIG. 14

1500

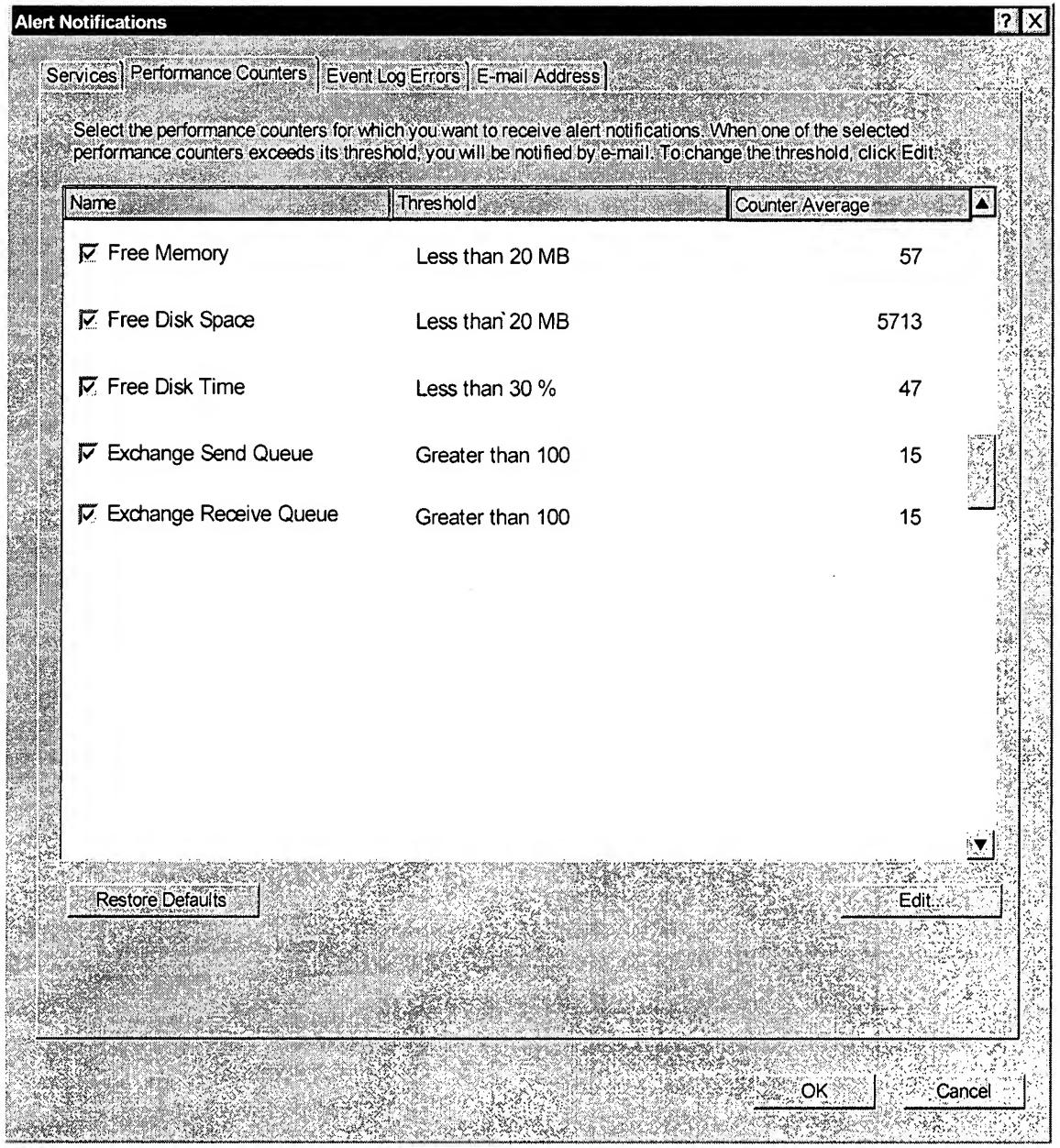

Alert Notifications
Services
Performance Counters
Event Log Errors
E-mail Address
Select the performance counters for which you want to receive alert notifications. When one of the selected performance counters exceeds its threshold, you will be notified by e-mail. To change the threshold, click Edit.
Name
Threshold
Counter Average
Free Memory
Less than 20 MB
57
Free Disk Space
Less than 20 MB
5713
Free Disk Time
Less than 30 %
47
Exchange Send Queue
Greater than 100
15
Exchange Receive Queue
Greater than 100
15
Restore Defaults
Edit...
OK
Cancel

FIG. 15

1600

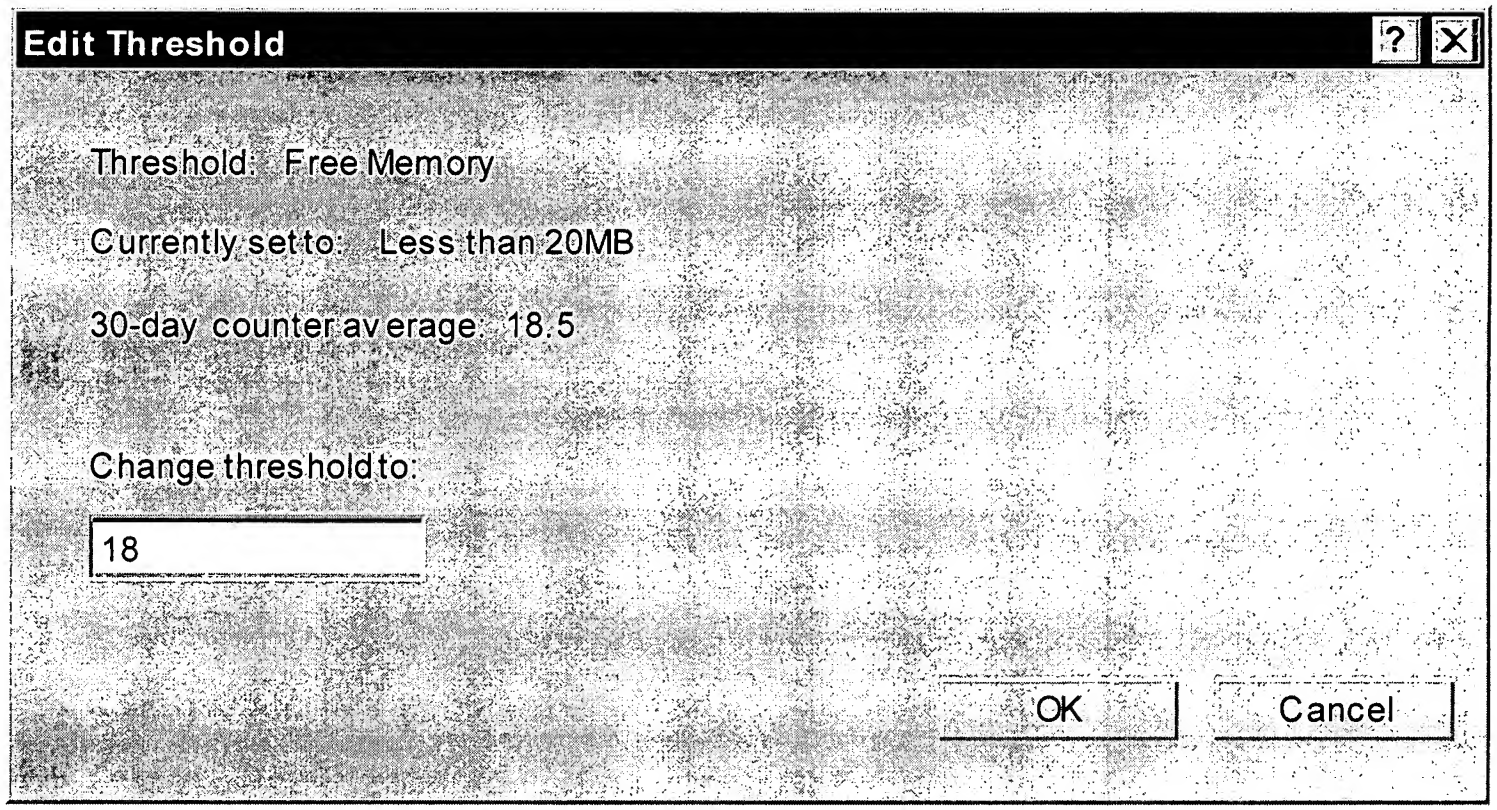

Edit Threshold
Threshold: Free Memory
Currently set to: Less than 20MB
30-day counter average: 18.5
Change threshold to:
18
OK
Cancel

FIG. 16

1700

Monitoring Configuration Wizard
Welcome to the Monitoring Configuration Wizard
This wizard helps you set up alert notifications and server performance and usage reports.
This wizard will create scheduled server reports sent to you by e-mail, set up alert notifications, and enable application logging. The usage report can also be viewed either from Server Management or your intranet.
To continue with the wizard, click Next.
< Back
Next >
Cancel

FIG. 17

1800

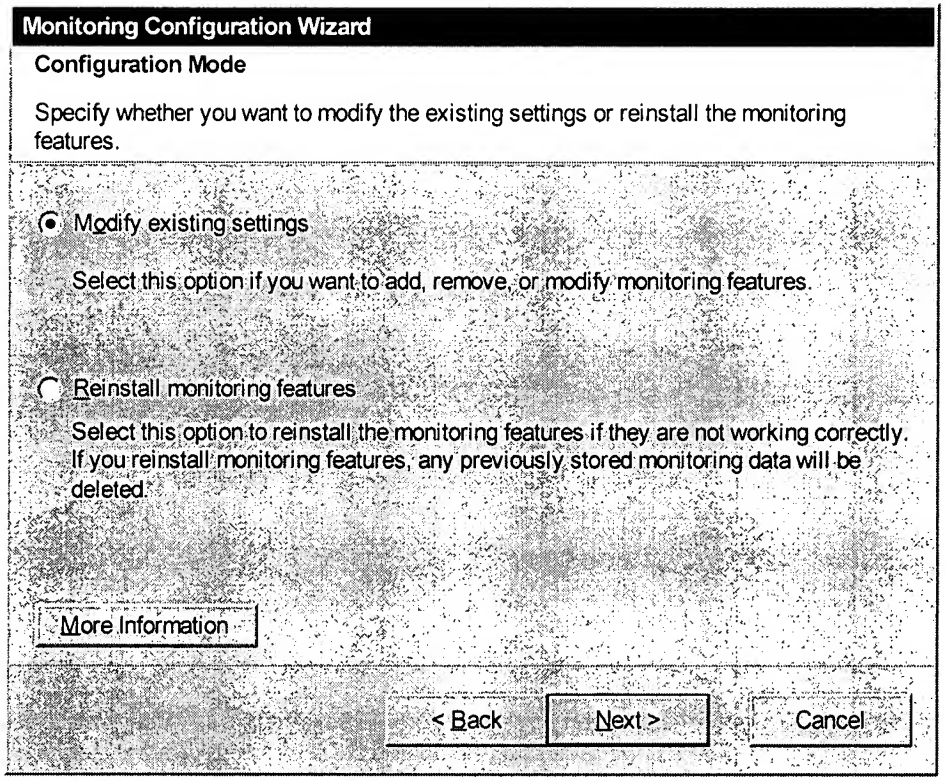

Monitoring Configuration Wizard
Configuration Mode
Specify whether you want to modify the existing settings or reinstall the monitoring features.
Modify existing settings
Select this option if you want to add, remove, or modify monitoring features.
Reinstall monitoring features
Select this option to reinstall the monitoring features if they are not working correctly. If you reinstall monitoring features, any previously stored monitoring data will be deleted.
More Information
< Back
Next >
Cancel

FIG. 18

1900

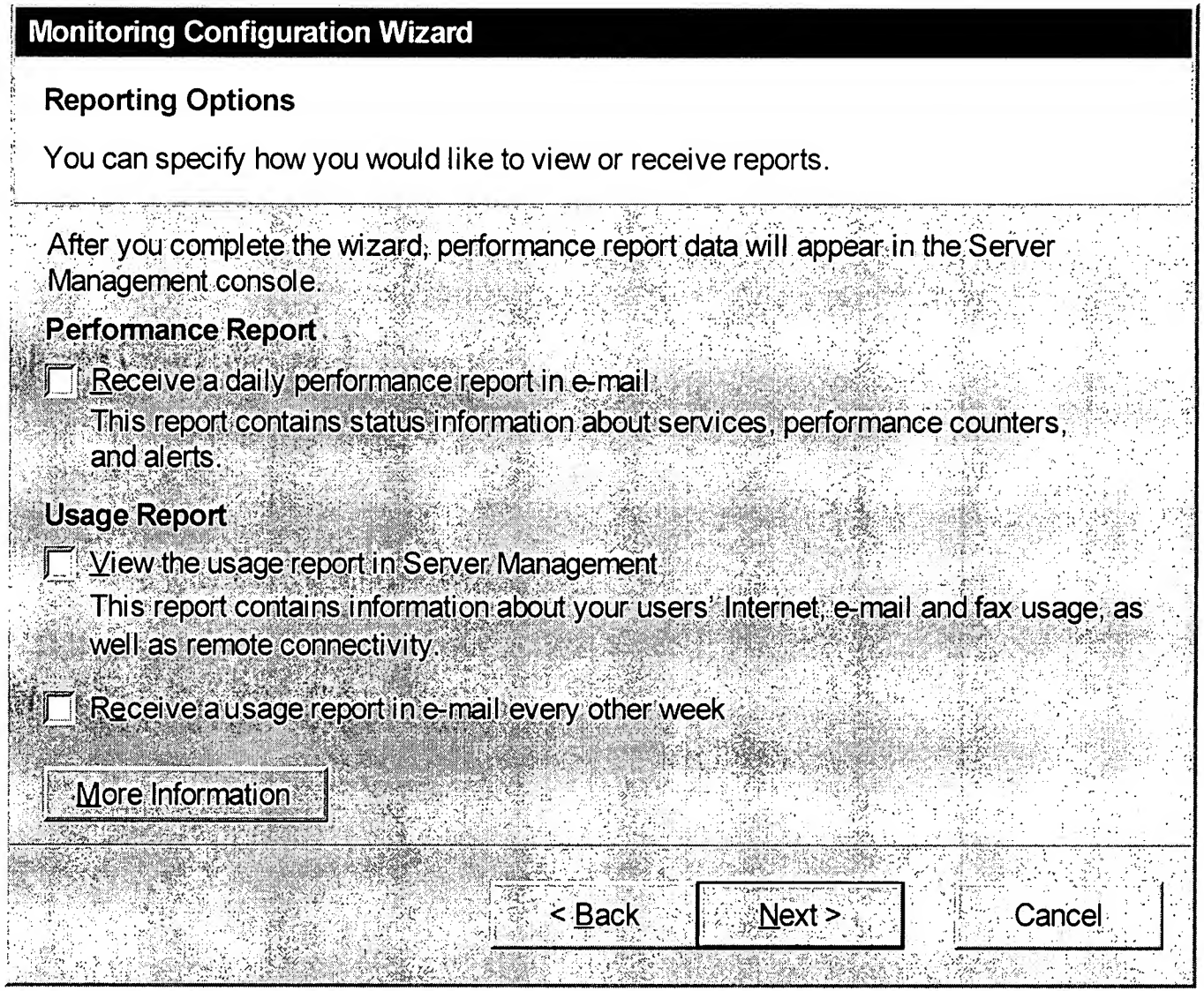

Monitoring Configuration Wizard
Reporting Options
You can specify how you would like to view or receive reports.
After you complete the wizard, performance report data will appear in the Server Management console.
Performance Report
Receive a daily performance report in e-mail
This report contains status information about services, performance counters, and alerts.
Usage Report
View the usage report in Server Management
This report contains information about your users' Internet, e-mail and fax usage, as well as remote connectivity.
Receive a usage report in e-mail every other week
More Information
< Back
Next >
Cancel

FIG. 19

2000

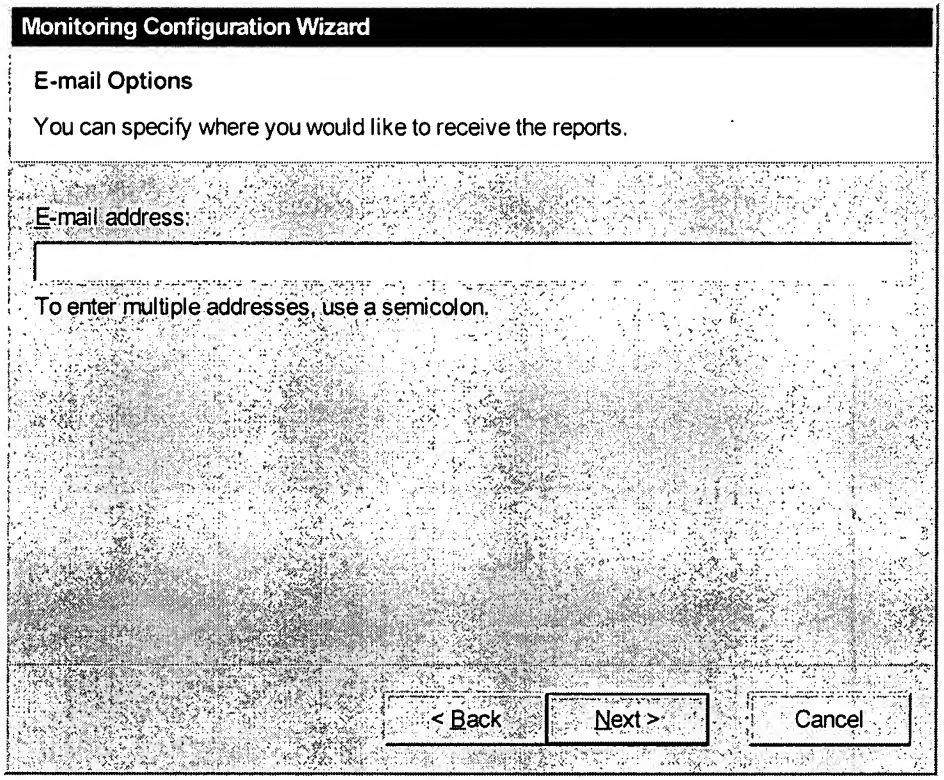

Monitoring Configuration Wizard
E-mail Options
You can specify where you would like to receive the reports.
E-mail address:
To enter multiple addresses, use a semicolon.
< Back
Next >
Cancel

FIG. 20

2100

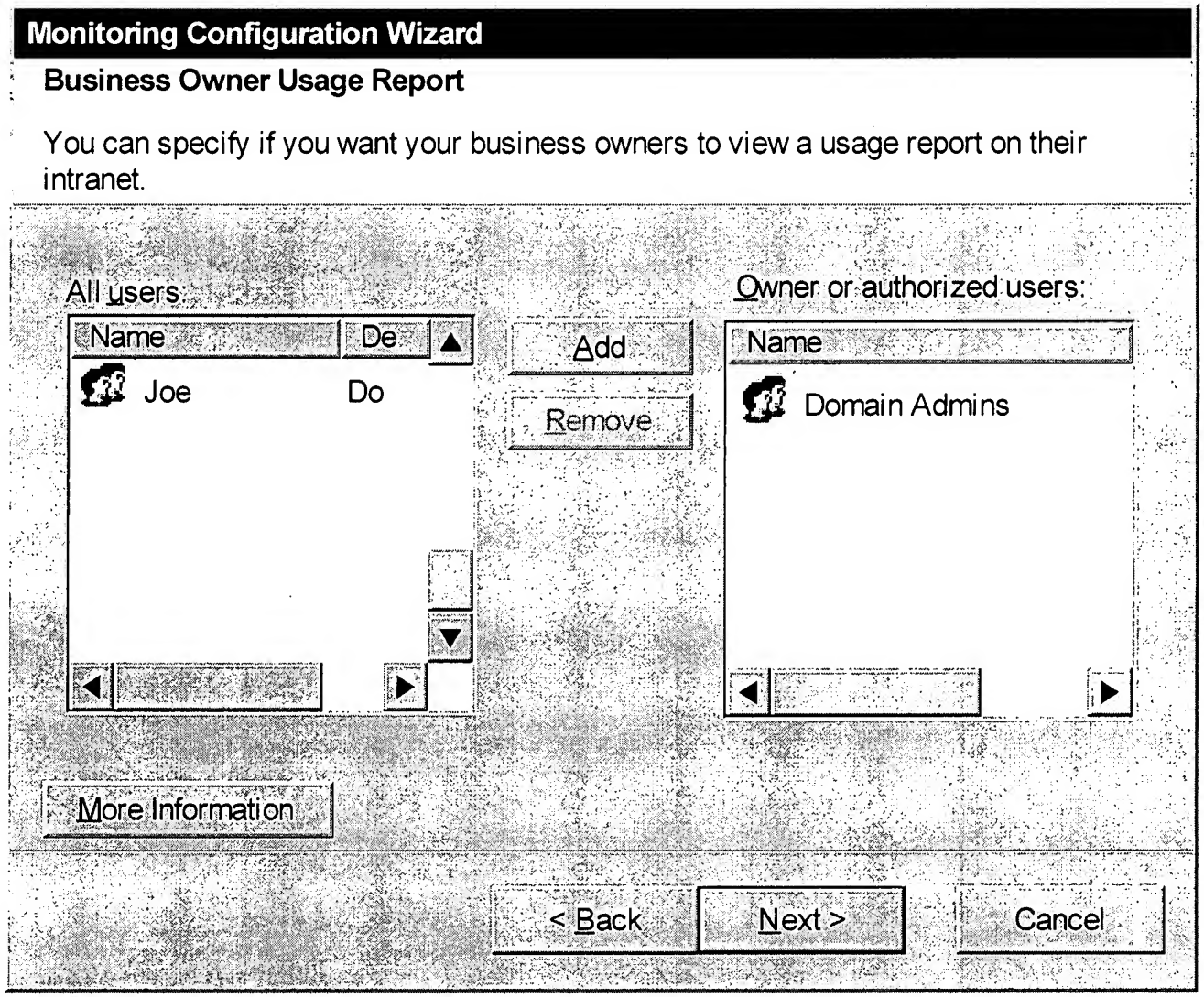

Monitoring Configuration Wizard
Business Owner Usage Report
You can specify if you want your business owners to view a usage report on their intranet.
All users:
Name
De
Joe
Do
Add
Remove
Owner or authorized users:
Name
Domain Admins
More Information
< Back
Next >
Cancel

FIG. 21

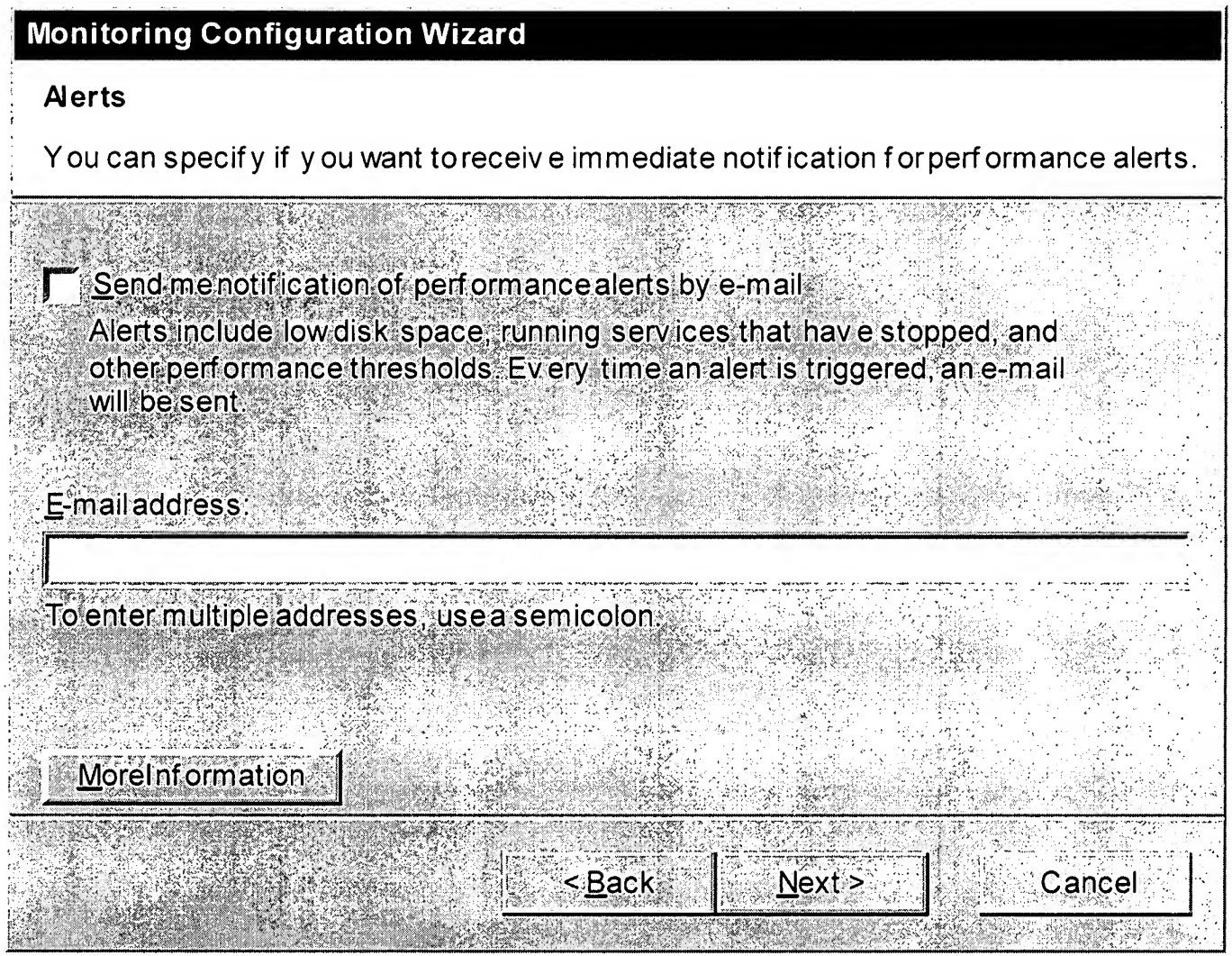

2200
Monitoring Configuration Wizard
Alerts
You can specify if you want to receive immediate notification for performance alerts.
Send me notification of performance alerts by e-mail
Alerts include low disk space, running services that have stopped, and other performance thresholds. Every time an alert is triggered, an e-mail will be sent.
E-mail address:
To enter multiple addresses, use a semicolon.
More Information
< Back
Next >
Cancel

FIG. 22

2300

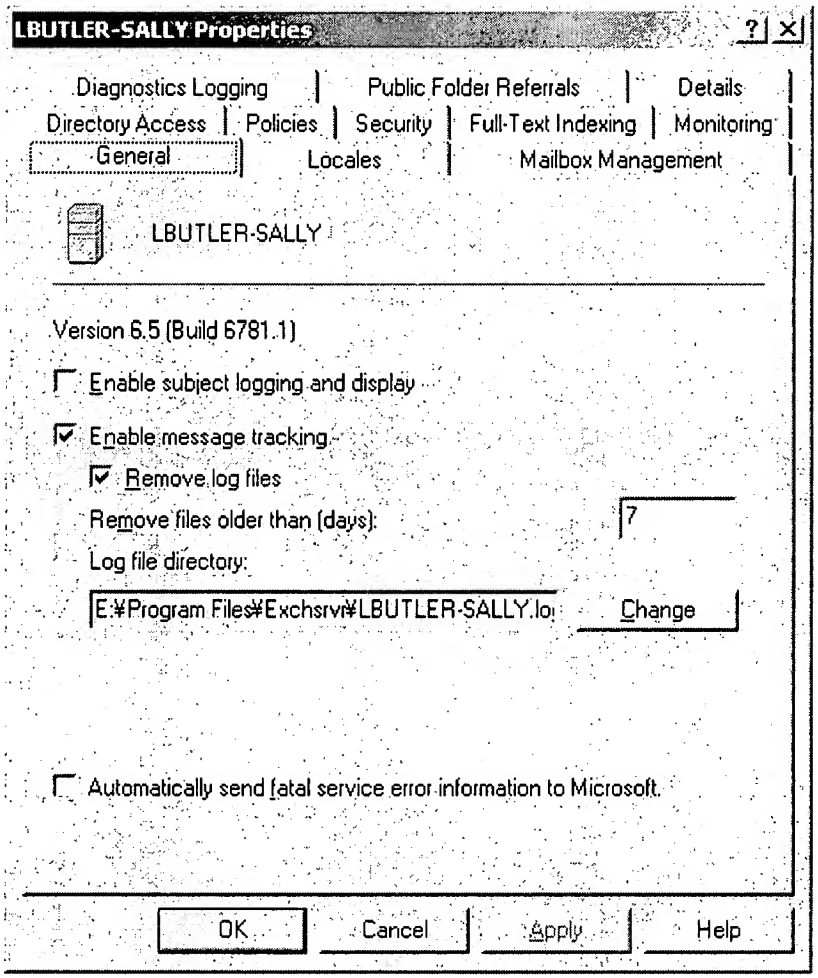

LBUTLER-SALLY Properties
Diagnostics Logging
Public Folder Referrals
Details
Directory Access
Policies
Security
Full-Text Indexing
Monitoring
General
Locales
Mailbox Management
LBUTLER-SALLY
Version 6.5 (Build 6781.1)
Enable subject logging and display
Enable message tracking
Remove log files
Remove files older than (days):
7
Log file directory:
E:¥Program Files¥Exchsrvr¥LBUTLER-SALLY.lo
Change
Automatically send fatal service error information to Microsoft.
OK
Cancel
Apply
Help

FIG. 23

2400

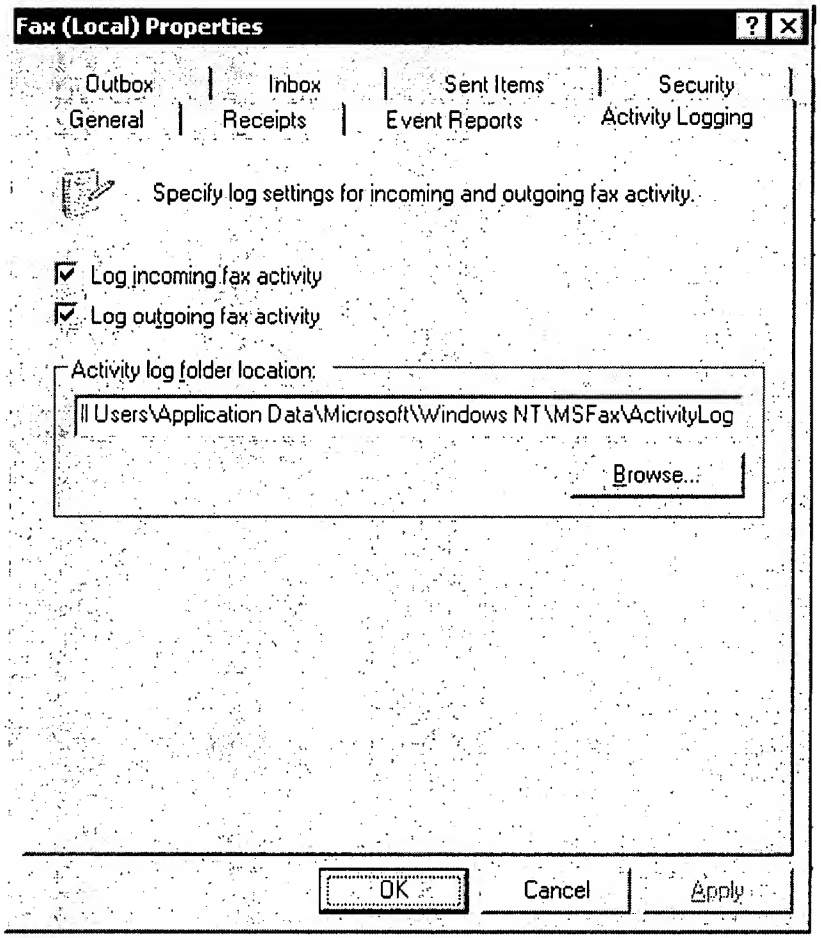

Fax (Local) Properties
Outbox
Inbox
Sent Items
Security
General
Receipts
Event Reports
Activity Logging
Specify log settings for incoming and outgoing fax activity.
Log incoming fax activity
Log outgoing fax activity
Activity log folder location:
ll Users\Application Data\Microsoft\Windows NT\MSFax\ActivityLog
Browse...
OK
Cancel
Apply

FIG. 24

2500

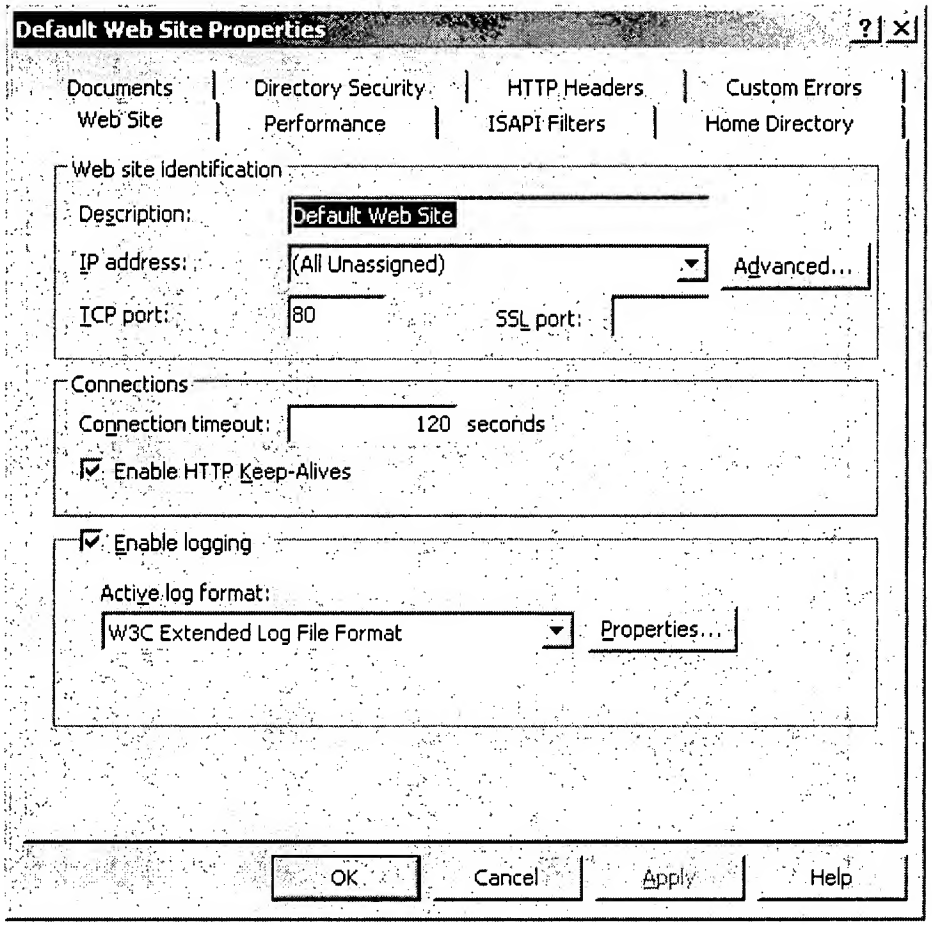

Default Web Site Properties
Documents
Directory Security
HTTP Headers
Custom Errors
Web Site
Performance
ISAPI Filters
Home Directory
Web site identification
Description:
Default Web Site
IP address:
(All Unassigned)
Advanced...
TCP port:
80
SSL port:
Connections
Connection timeout:
120
seconds
Enable HTTP Keep-Alives
Enable logging
Active log format:
W3C Extended Log File Format
Properties...
OK
Cancel
Apply
Help

FIG. 25

2600

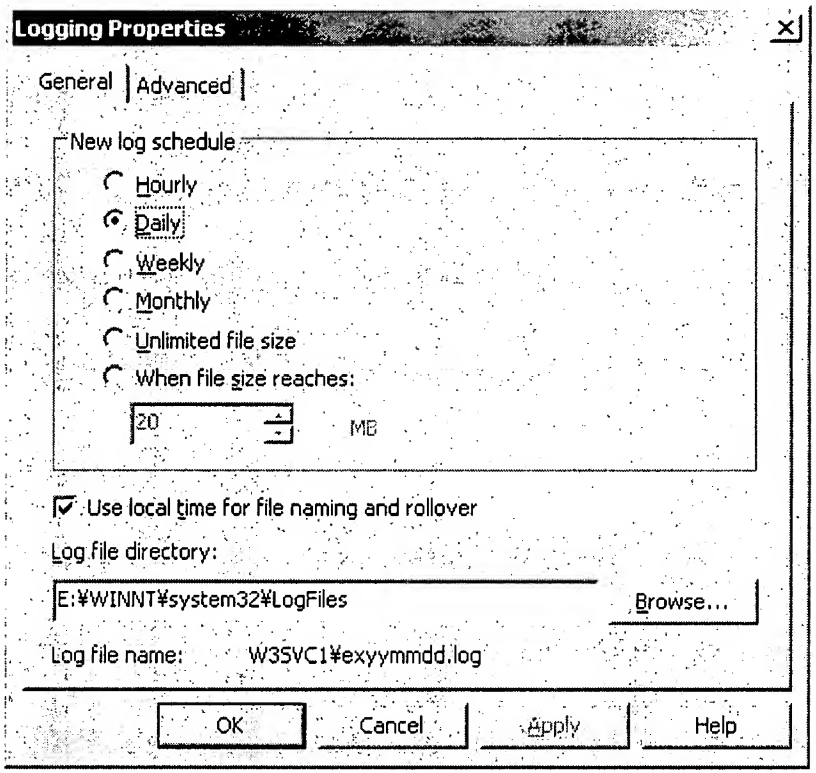

Logging Properties
General
Advanced
New log schedule
Hourly
Daily
Weekly
Monthly
Unlimited file size
When file size reaches:
20
MB
Use local time for file naming and rollover
Log file directory:
E:¥WINNT¥system32¥LogFiles
Browse...
Log file name:
W3SVC1¥exyymmdd.log
OK
Cancel
Apply
Help

FIG. 26

2700

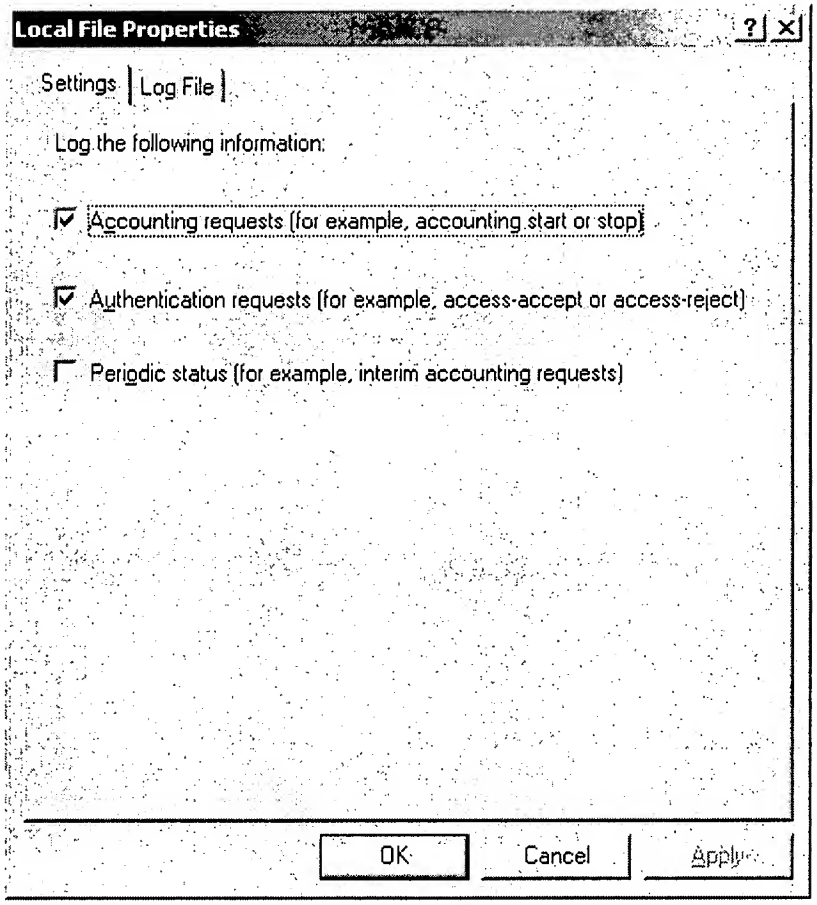

Local File Properties
Settings
Log File
Log the following information:
Accounting requests (for example, accounting start or stop)
Authentication requests (for example, access-accept or access-reject)
Periodic status (for example, interim accounting requests)
OK
Cancel
Apply

FIG. 27

2800

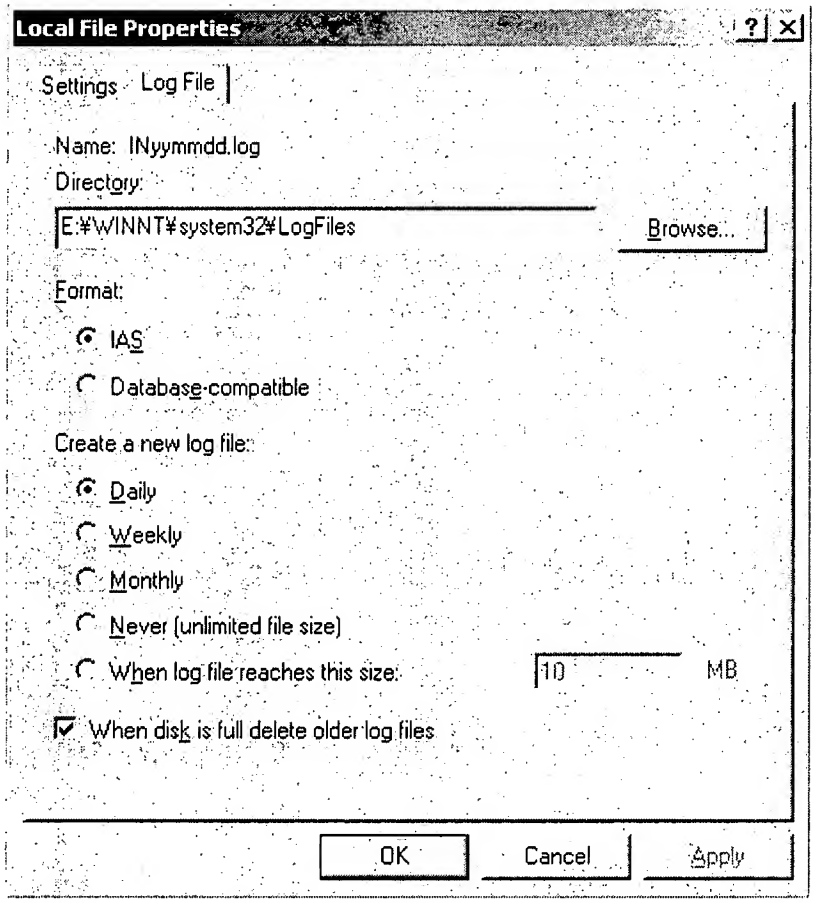

Local File Properties
Settings
Log File
Name: INyymmdd.log
Directory:
E:¥WINNT¥system32¥LogFiles
Browse...
Format:
IAS
Database-compatible
Create a new log file:
Daily
Weekly
Monthly
Never (unlimited file size)
When log file reaches this size:
10
MB
When disk is full delete older log files
OK
Cancel
Apply

FIG. 28

2900

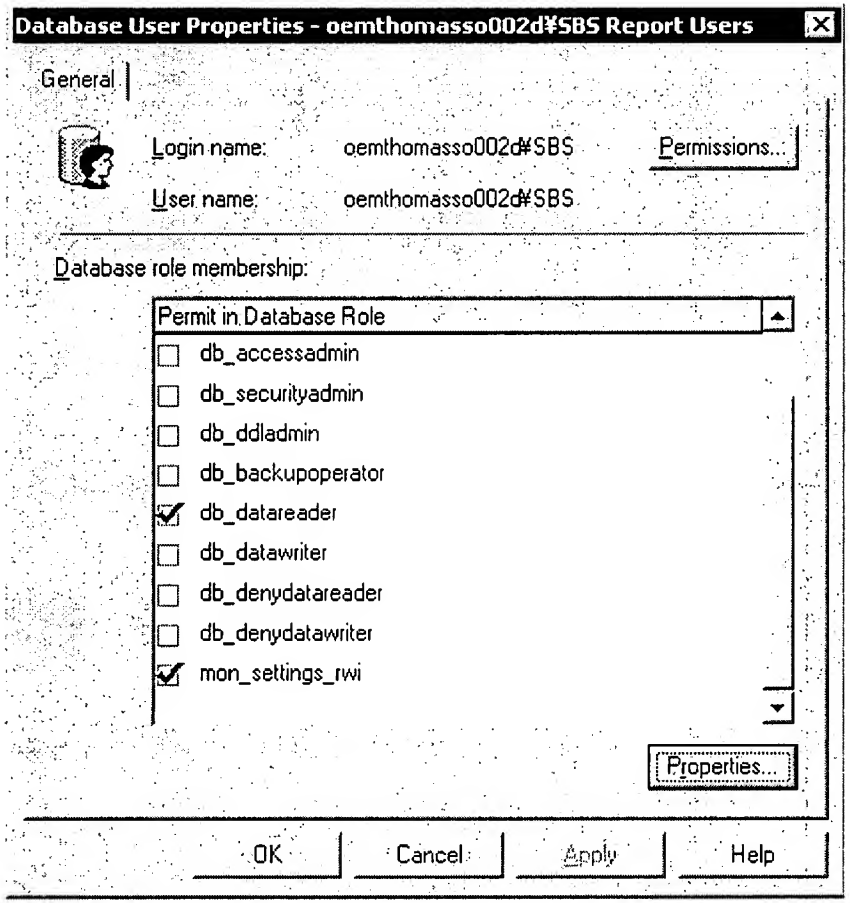

Database User Properties - oemthomasso002d¥SBS Report Users
General
Login name:
oemthomasso002d#SBS
Permissions...
User name:
oemthomasso002d#SBS
Database role membership:
Permit in Database Role
db_accessadmin
db_securityadmin
db_ddladmin
db_backupoperator
db_datareader
db_datawriter
db_denydatareader
db_denydatawriter
mon_settings_rwi
Properties...
OK
Cancel
Apply
Help

FIG. 29

3000

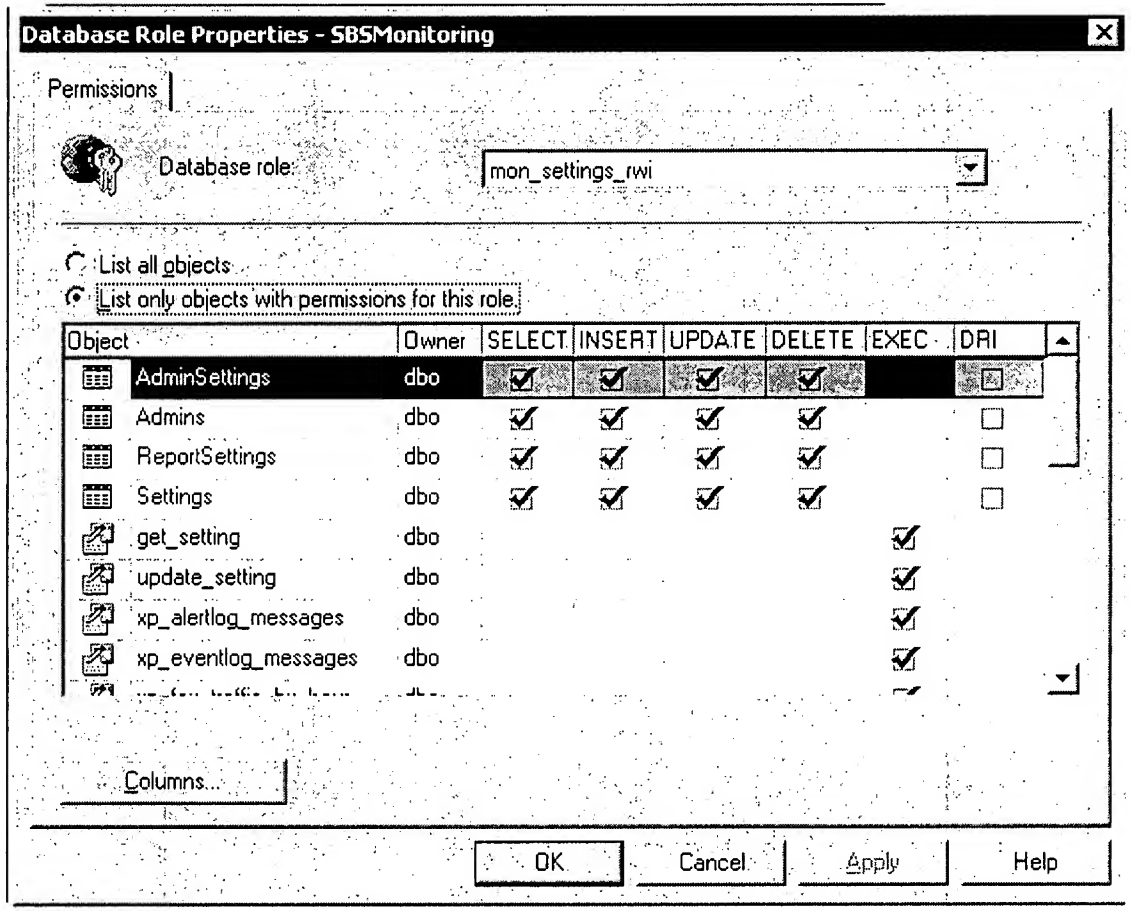

Database Role Properties - SBSMonitoring
Permissions
Database role:
mon_settings_rwi
List all objects
List only objects with permissions for this role.
Object
Owner
SELECT
INSERT
UPDATE
DELETE
EXEC
DRI
AdminSettings
dbo
Admins
dbo
ReportSettings
dbo
Settings
dbo
get_setting
dbo
update_setting
dbo
xp_alertlog_messages
dbo
xp_eventlog_messages
dbo
Columns...
OK
Cancel
Apply
Help

FIG. 30

3100

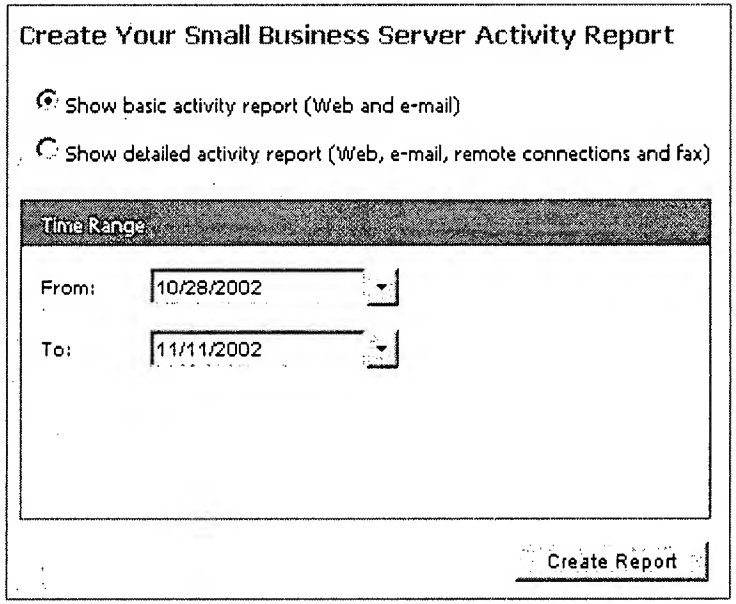

Create Your Small Business Server Activity Report
Show basic activity report (Web and e-mail)
Show detailed activity report (Web, e-mail, remote connections and fax)
Time Range
From:
10/28/2002
To:
11/11/2002
Create Report

FIG. 31

3200

E-mail Sent

User Name	Internal E-mail	MB	External E-mail	MB	Total E-mail Sent	MB
Derick Namgreb	150	3	150	16.2	300	19.2
John Howard	60	42.4	18	455.6	78	498
Company Total	210	45.4	168	471.8	378	517.2

E-mail Received

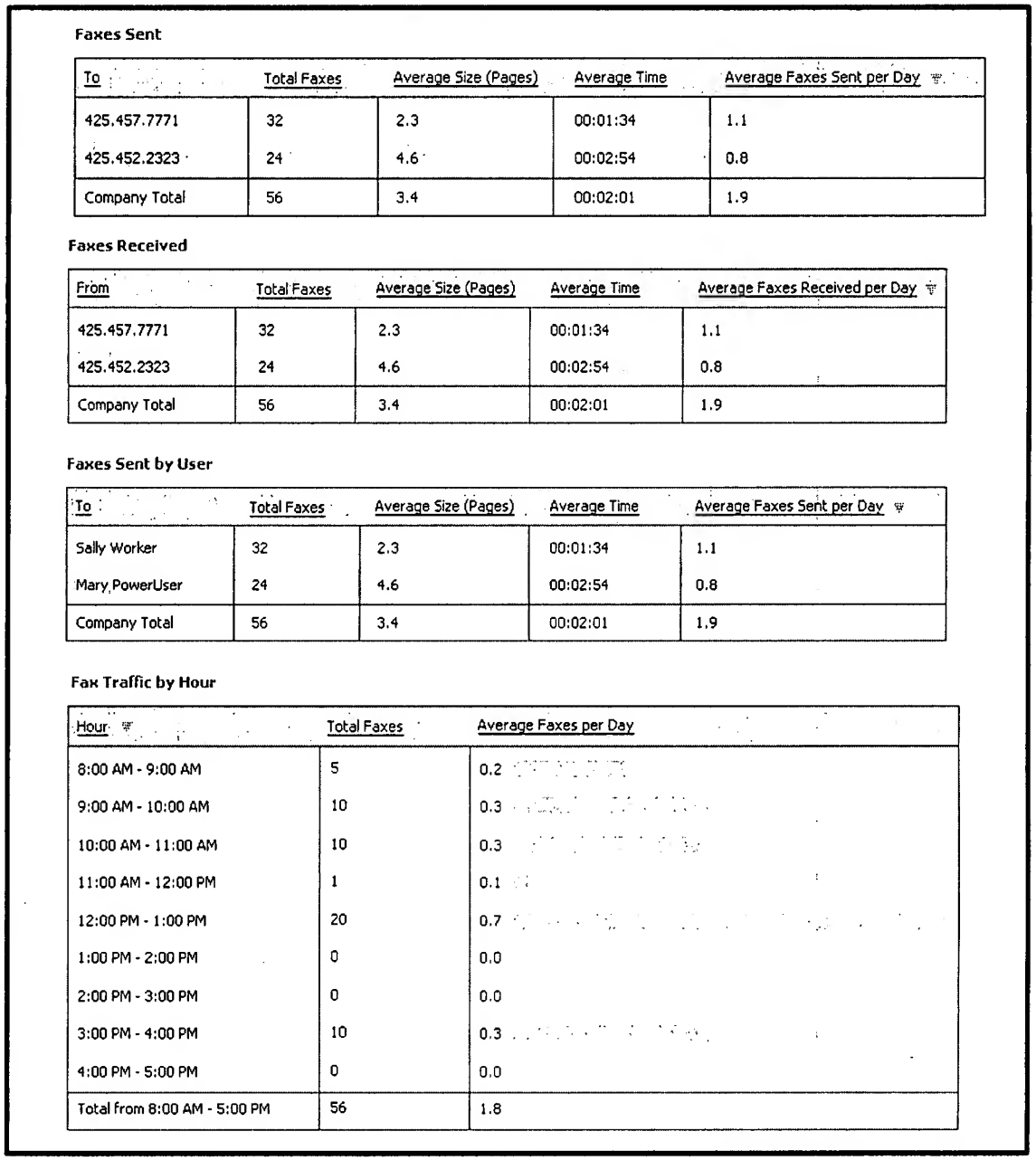
User Name	Internal E-mail	MB	External E-mail	MB	Total E-mail Received	MB
Derick Namgreb	25	3	75	16.2	100	19.2
John Howard	30	42.4	48	455.6	78	498
Company Total	55	45.4	123	471.8	178	517.2

Mailbox Size

User Name	Starting Size (MB)	Ending Size (MB)	Rate of Change
Derick Namgreb	25	75	200%
John Howard	30	48	60%
Company Total	55	123	124%

FIG. 32

3300



Faxes Sent

To	Total Faxes	Average Size (Pages)	Average Time	Average Faxes Sent per Day
425.457.7771	32	2.3	00:01:34	1.1
425.452.2323	24	4.6	00:02:54	0.8
Company Total	56	3.4	00:02:01	1.9

Faxes Received

From	Total Faxes	Average Size (Pages)	Average Time	Average Faxes Received per Day
425.457.7771	32	2.3	00:01:34	1.1
425.452.2323	24	4.6	00:02:54	0.8
Company Total	56	3.4	00:02:01	1.9

Faxes Sent by User

To	Total Faxes	Average Size (Pages)	Average Time	Average Faxes Sent per Day
Sally Worker	32	2.3	00:01:34	1.1
Mary PowerUser	24	4.6	00:02:54	0.8
Company Total	56	3.4	00:02:01	1.9

Fax Traffic by Hour

Hour	Total Faxes	Average Faxes per Day
8:00 AM - 9:00 AM	5	0.2
9:00 AM - 10:00 AM	10	0.3
10:00 AM - 11:00 AM	10	0.3
11:00 AM - 12:00 PM	1	0.1
12:00 PM - 1:00 PM	20	0.7
1:00 PM - 2:00 PM	0	0.0
2:00 PM - 3:00 PM	0	0.0
3:00 PM - 4:00 PM	10	0.3
4:00 PM - 5:00 PM	0	0.0
Total from 8:00 AM - 5:00 PM	56	1.8

FIG. 33

3400

Shared Document Usage by User

User Name	Documents Accessed	Average Documents Accessed per Day
John Howard	24	0.8
Company Total	56	1.9

Shared Document Usage

Document Name	Times Accessed	Average Access per Day
budget.xls	24	0.8
Company Total	56	1.9

FIG. 34

3500

Web Activity by Computer

Computer Name	Total Active Hours	Average Active Hours per Day
Computer_01	300	10
Computer_02	155	5.2
Company Total	455	15.2

Web Traffic by Hour

Hour	Total Connections	Average Connections per Day
8:00 AM - 9:00 AM	200	6.7
9:00 AM - 10:00 AM	100	3.3
10:00 AM - 11:00 AM	50	1.7
11:00 AM - 12:00 PM	1	0.1
12:00 PM - 1:00 PM	100	3.3
1:00 PM - 2:00 PM	1	0.1
2:00 PM - 3:00 PM	1	0.1
3:00 PM - 4:00 PM	1	0.1
4:00 PM - 5:00 PM	1	0.1
Total from 8:00 AM - 5:00 PM	455	15.2

FIG. 35

3600

Outlook Web Access Activity by User

User Name	Visits	Average Visits per Day
Derick Namgreb	30	1
John Howard	15	0.5
Company Total	45	1.5

Outlook Web Access Usage by Hour

Hour	Total Visits	Average Visits per Day
8:00 AM - 9:00 AM	20	0.6
9:00 AM - 10:00 AM	10	0.3
10:00 AM - 11:00 AM	0	0
11:00 AM - 12:00 PM	0	0
12:00 PM - 1:00 PM	0	0
1:00 PM - 2:00 PM	0	0
2:00 PM - 3:00 PM	0	0
3:00 PM - 4:00 PM	0	0
4:00 PM - 5:00 PM	15	0.5
Total from 8:00 AM - 5:00 PM	45	1.5

FIG. 36

3700

Remote Connection Activity by User

User Name	Total Connections	Average Time	Average Connections per Day
Alan Billharz	3	02:34:56	0.2
Alex Hinrichs	2	00:01:22	0.1
Alp Onalan	2	00:07:49	0.1
Charles Anthe	4	00:05:17	0.3
Company Total	56	00:19:13	3.7

Remote Connection Activity by Hour

Hour	Total Connections	Average Connections per Day
8:00 AM - 9:00 AM	20	0.6
9:00 AM - 10:00 AM	10	0.3
10:00 AM - 11:00 AM	0	0
11:00 AM - 12:00 PM	0	0
12:00 PM - 1:00 PM	0	0
1:00 PM - 2:00 PM	0	0
2:00 PM - 3:00 PM	0	0
3:00 PM - 4:00 PM	0	0
4:00 PM - 5:00 PM	15	0.5
Total from 8:00 AM - 5:00 PM	45	1.5

FIG. 37

3800

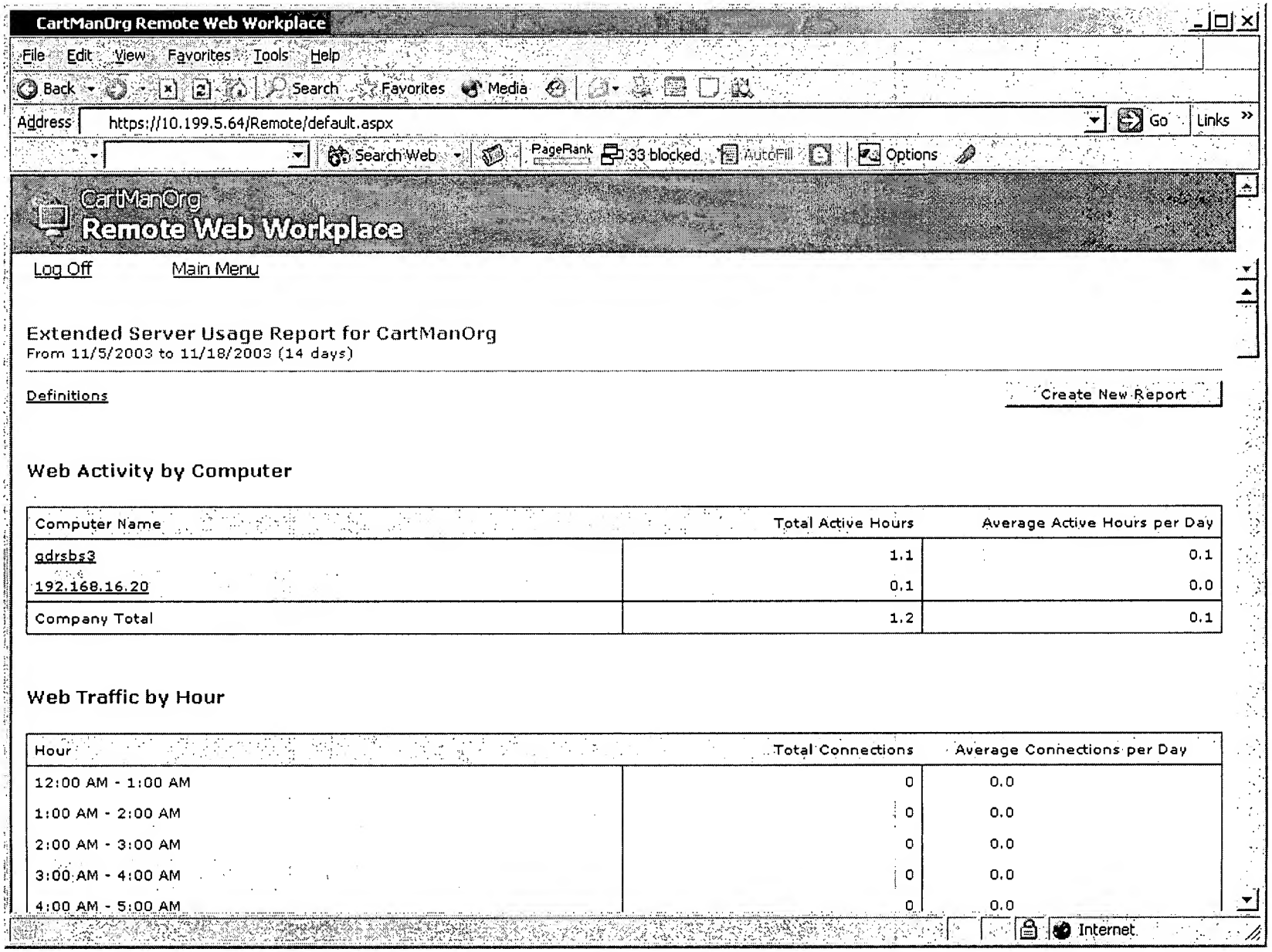

CartManOrg Remote Web Workplace
File Edit View Favorites Tools Help
Back Search Favorites Media
Address https://10.199.5.64/Remote/default.aspx
Go Links
Search Web PageRank 33 blocked AutoFill Options
CartManOrg
Remote Web Workplace
Log Off
Main Menu
Extended Server Usage Report for CartManOrg
From 11/5/2003 to 11/18/2003 (14 days)
Definitions
Create New Report
Web Activity by Computer
Computer Name | Total Active Hours | Average Active Hours per Day
qdrsbs3 | 1.1 | 0.1
192.168.16.20 | 0.1 | 0.0
Company Total | 1.2 | 0.1
Web Traffic by Hour
Hour | Total Connections | Average Connections per Day
12:00 AM - 1:00 AM | 0 | 0.0
1:00 AM - 2:00 AM | 0 | 0.0
2:00 AM - 3:00 AM | 0 | 0.0
3:00 AM - 4:00 AM | 0 | 0.0
4:00 AM - 5:00 AM | 0 | 0.0
Internet

FIG. 38

3900

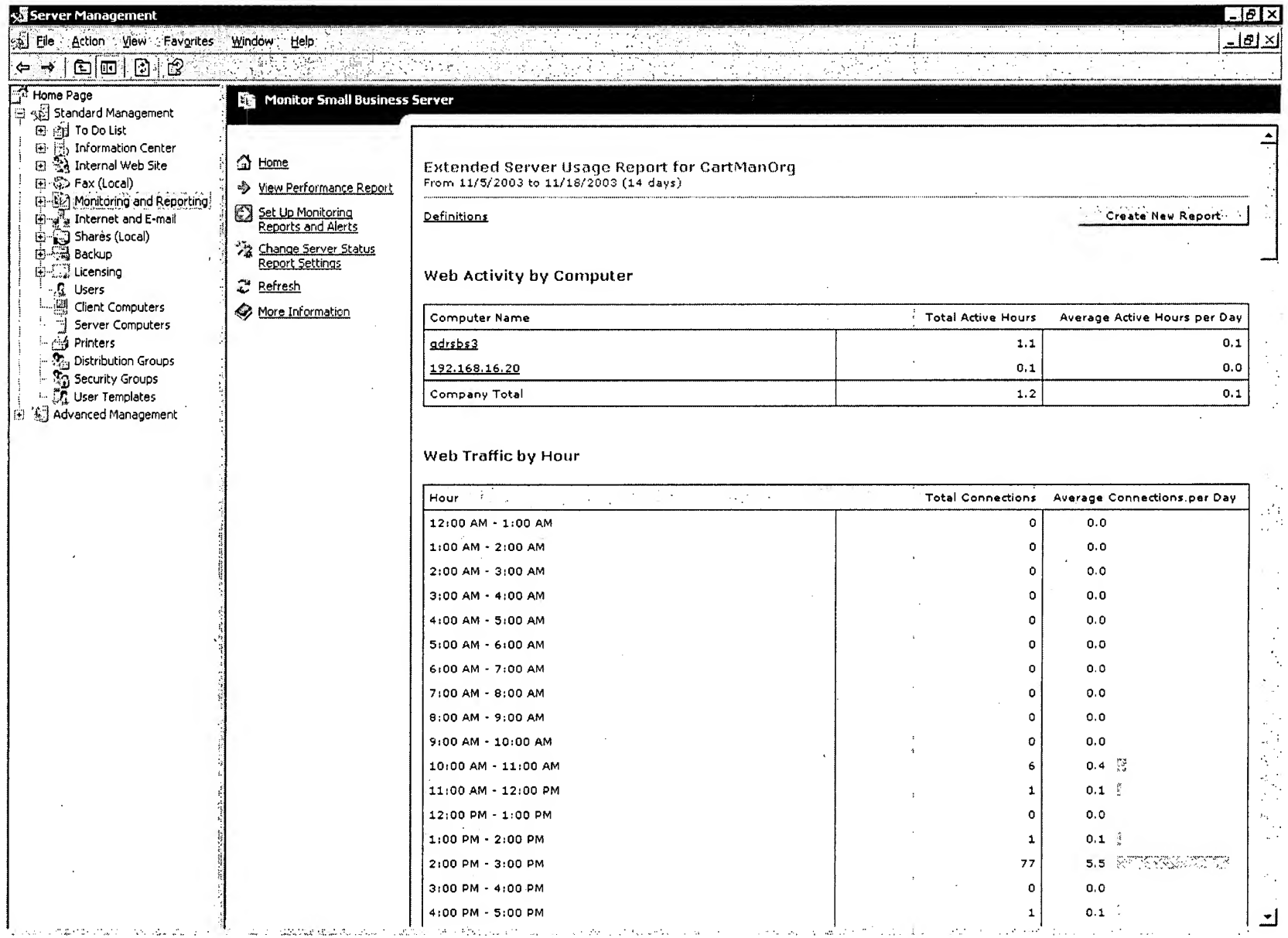

Server Management
File Action View Favorites Window Help
Home Page
Standard Management
To Do List
Information Center
Internal Web Site
Fax (Local)
Monitoring and Reporting
Internet and E-mail
Shares (Local)
Backup
Licensing
Users
Client Computers
Server Computers
Printers
Distribution Groups
Security Groups
User Templates
Advanced Management
Monitor Small Business Server
Home
View Performance Report
Set Up Monitoring Reports and Alerts
Change Server Status Report Settings
Refresh
More Information
Extended Server Usage Report for CartManOrg
From 11/5/2003 to 11/18/2003 (14 days)
Definitions
Create New Report
Web Activity by Computer
Computer Name | Total Active Hours | Average Active Hours per Day
gdrsbs3 | 1.1 | 0.1
192.168.16.20 | 0.1 | 0.0
Company Total | 1.2 | 0.1
Web Traffic by Hour
Hour | Total Connections | Average Connections per Day
12:00 AM - 1:00 AM | 0 | 0.0
1:00 AM - 2:00 AM | 0 | 0.0
2:00 AM - 3:00 AM | 0 | 0.0
3:00 AM - 4:00 AM | 0 | 0.0
4:00 AM - 5:00 AM | 0 | 0.0
5:00 AM - 6:00 AM | 0 | 0.0
6:00 AM - 7:00 AM | 0 | 0.0
7:00 AM - 8:00 AM | 0 | 0.0
8:00 AM - 9:00 AM | 0 | 0.0
9:00 AM - 10:00 AM | 0 | 0.0
10:00 AM - 11:00 AM | 6 | 0.4
11:00 AM - 12:00 PM | 1 | 0.1
12:00 PM - 1:00 PM | 0 | 0.0
1:00 PM - 2:00 PM | 1 | 0.1
2:00 PM - 3:00 PM | 77 | 5.5
3:00 PM - 4:00 PM | 0 | 0.0
4:00 PM - 5:00 PM | 1 | 0.1

FIG. 39

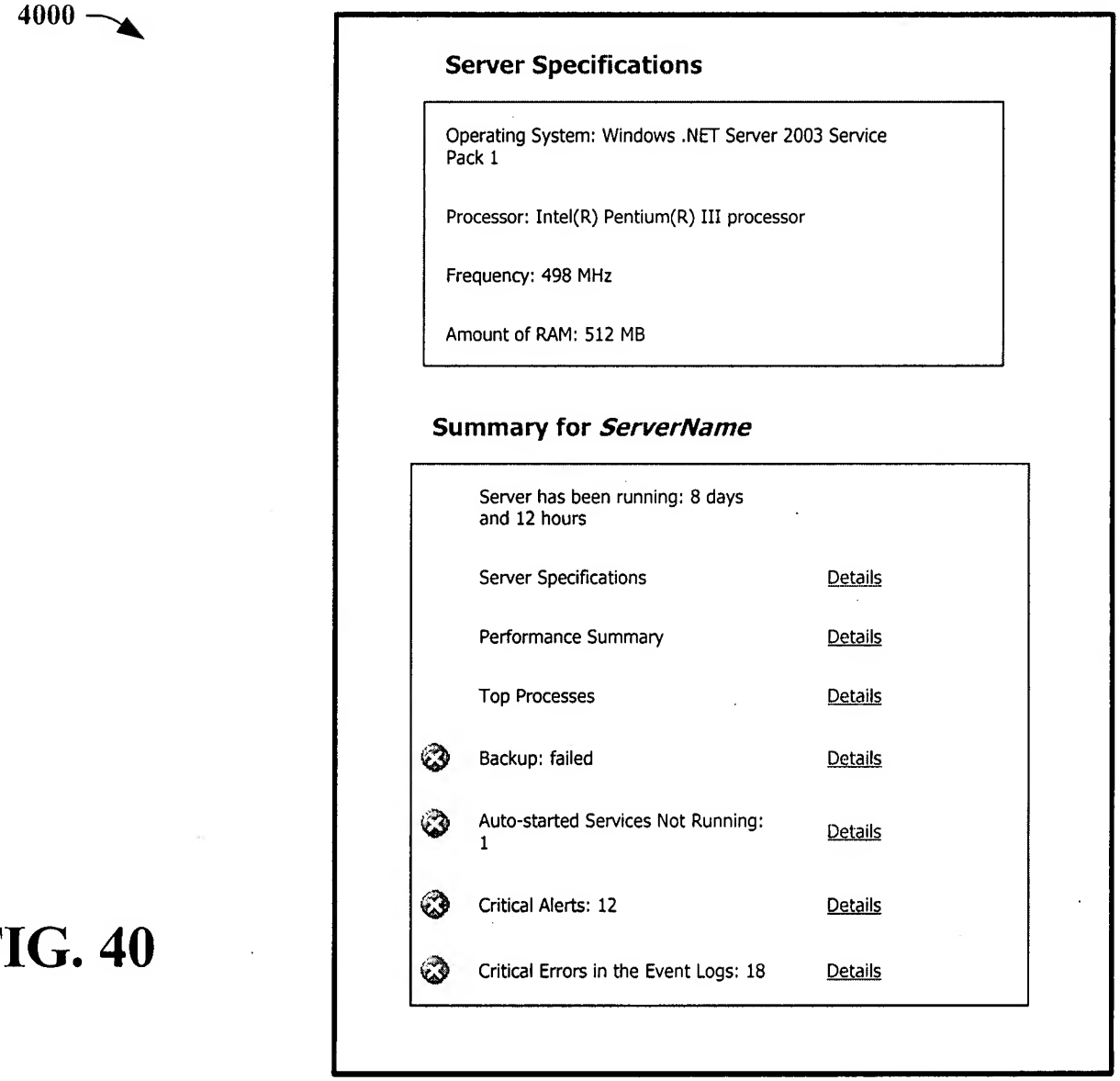

4000
Server Specifications
Operating System: Windows .NET Server 2003 Service Pack 1
Processor: Intel(R) Pentium(R) III processor
Frequency: 498 MHz
Amount of RAM: 512 MB
Summary for ServerName
Server has been running: 8 days and 12 hours
Server Specifications Details
Performance Summary Details
Top Processes Details
Backup: failed Details
Auto-started Services Not Running: 1 Details
Critical Alerts: 12 Details
Critical Errors in the Event Logs: 18 Details

FIG. 40

4100

Performance Summary

Performance Counters	Today	Last Month	Rate of Growth
Memory in use	220 MB	210 MB	2%
Free disk space (C:)	1,262 MB	1,262 MB	4%
Free disk space (D:)	26,999 MB	26,999 MB	3%
Free disk space (E:)	15,000 MB	15,000 MB	2%
Busy disk time (0 C: D: E:)	45%	45%	20%
CPU use (0)	22%	11%	100%

FIG. 41

4200

Top 5 Processes by Memory Usage

Process Name - ID	Memory Usage
lsass - 528	225 MB
STORE - 2664	178 MB
sqlservr - 2080	88 MB
inetinfo - 1608	70 MB
services - 516	41 MB

Top 5 Processes by CPU Usage

Process Name - ID	CPU Time
lsass - 528	16.0 %
STORE - 2664	12.7 %
sqlservr - 2080	6.3 %
inetinfo - 1608	5.0 %
services - 516	2.9 %

FIG. 42

4300

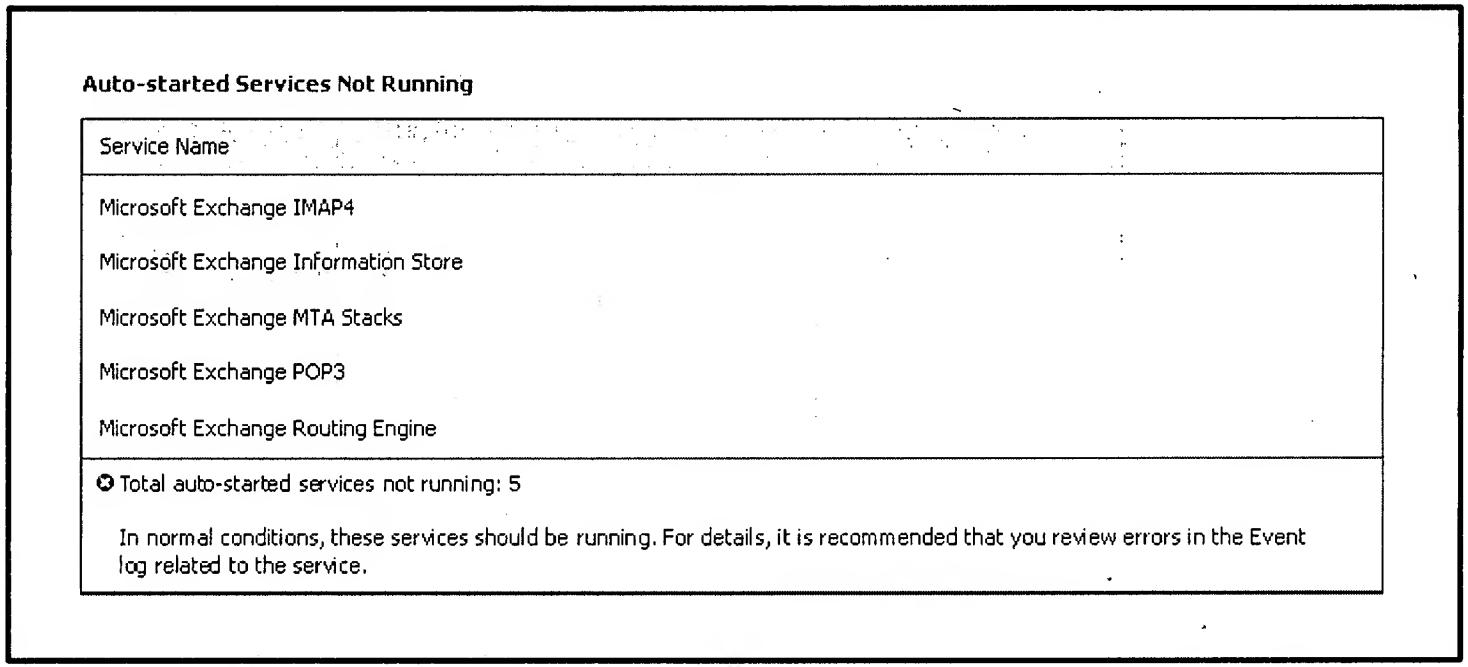

Auto-started Services Not Running
Service Name
Microsoft Exchange IMAP4
Microsoft Exchange Information Store
Microsoft Exchange MTA Stacks
Microsoft Exchange POP3
Microsoft Exchange Routing Engine
Total auto-started services not running: 5
In normal conditions, these services should be running. For details, it is recommended that you review errors in the Event log related to the service.

FIG. 43

4400

Critical Alerts

Issue	Last Occurrence	Total Occurrences
Low Memory	6/16/2002, 05:59 AM	5

Low available memory may significantly decrease server performance and prevent applications from running properly.

Recommended State At least 20 MB
Current State 5.7 MB

Issue	Last Occurrence	Total Occurrences
Low Free Disk space	6/16/2002, 02:59 AM	3

Low free disk space may significantly decrease server performance and prevent applications from running properly.

Recommended State At least 20 MB
Current State 5.7 MB

Critical Errors in Application Log

Source	Event ID	Last Occurrence	Total Occurrences
Microsoft Fax	32012	6/16/2002, 02:59 AM	79 *

The attempt to send the fax failed. There was no answer. This fax will not be sent, because the maximum number of retries has been exhausted. Sender: name. Billing code: password. Sender company: company. Sender dept: Department. Recipient name: . Recipient number: 7743948. Device name: Courier V.Everything EXT PnP (V90-x2).

Source	Event ID	Last Occurrence	Total Occurrences
MS Exchange SA	9175	6/16/2002, 03:59 AM	54*

The attempt to send the fax failed. There was no answer. This fax will not be sent, because the maximum number of retries has been exhausted. Sender: name. Billing code: password. Sender company: company. Sender dept: Department. Recipient name: . Recipient number: 7743948. Device name: Courier V.Everything EXT PnP (V90-x2).

FIG. 44

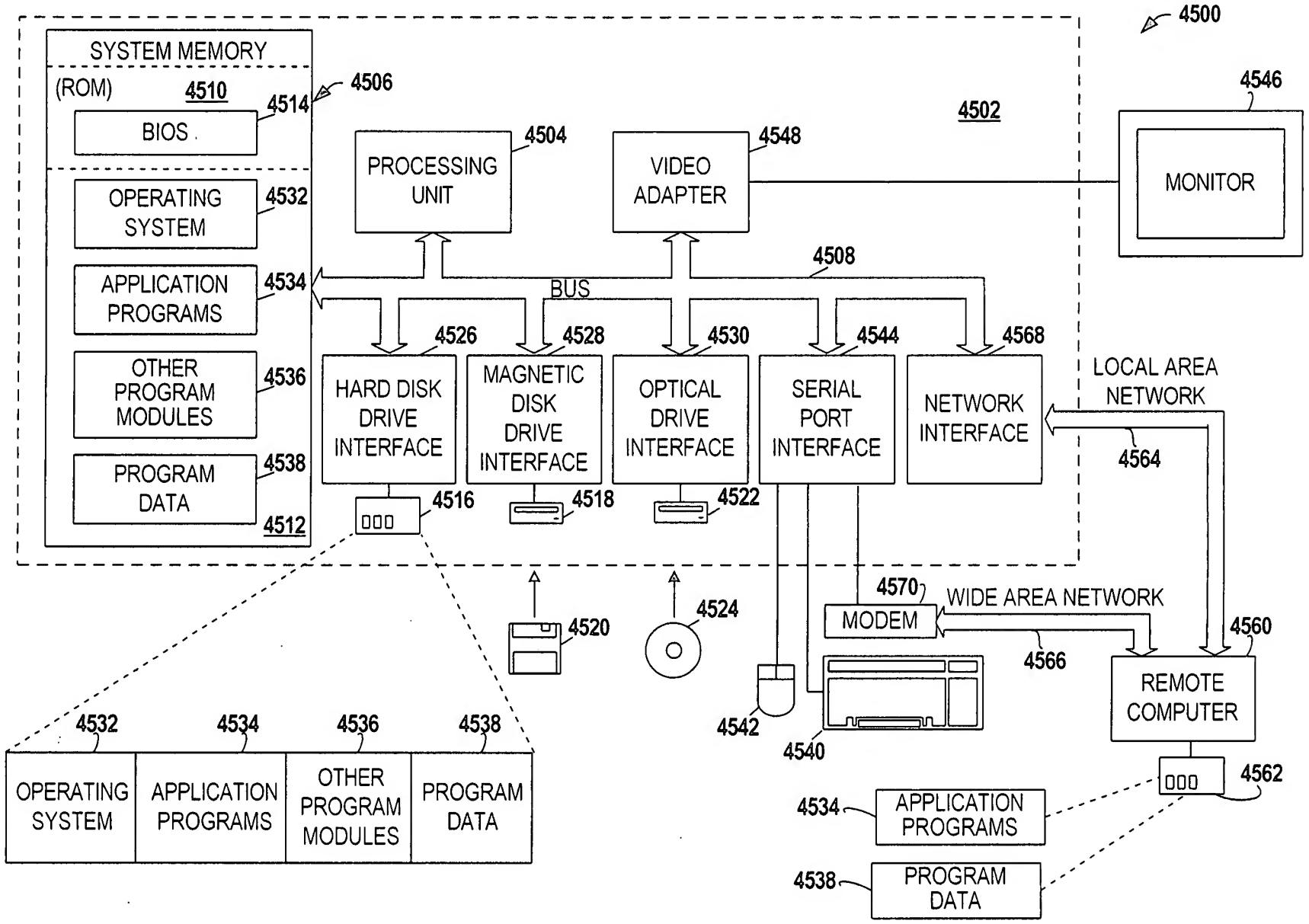

4500
SYSTEM MEMORY
(ROM)
4510
4514
4506
BIOS
OPERATING SYSTEM
4532
APPLICATION PROGRAMS
4534
OTHER PROGRAM MODULES
4536
PROGRAM DATA
4538
4512
4502
PROCESSING UNIT
4504
VIDEO ADAPTER
4548
4546
MONITOR
4508
BUS
4526
4528
4530
4544
4568
HARD DISK DRIVE INTERFACE
MAGNETIC DISK DRIVE INTERFACE
OPTICAL DRIVE INTERFACE
SERIAL PORT INTERFACE
NETWORK INTERFACE
LOCAL AREA NETWORK
4564
4516
4518
4522
4520
4524
4570
MODEM
WIDE AREA NETWORK
4566
4560
REMOTE COMPUTER
4542
4540
4562
4532
4534
4536
4538
OPERATING SYSTEM
APPLICATION PROGRAMS
OTHER PROGRAM MODULES
PROGRAM DATA
4534
APPLICATION PROGRAMS
4538
PROGRAM DATA

FIG. 45

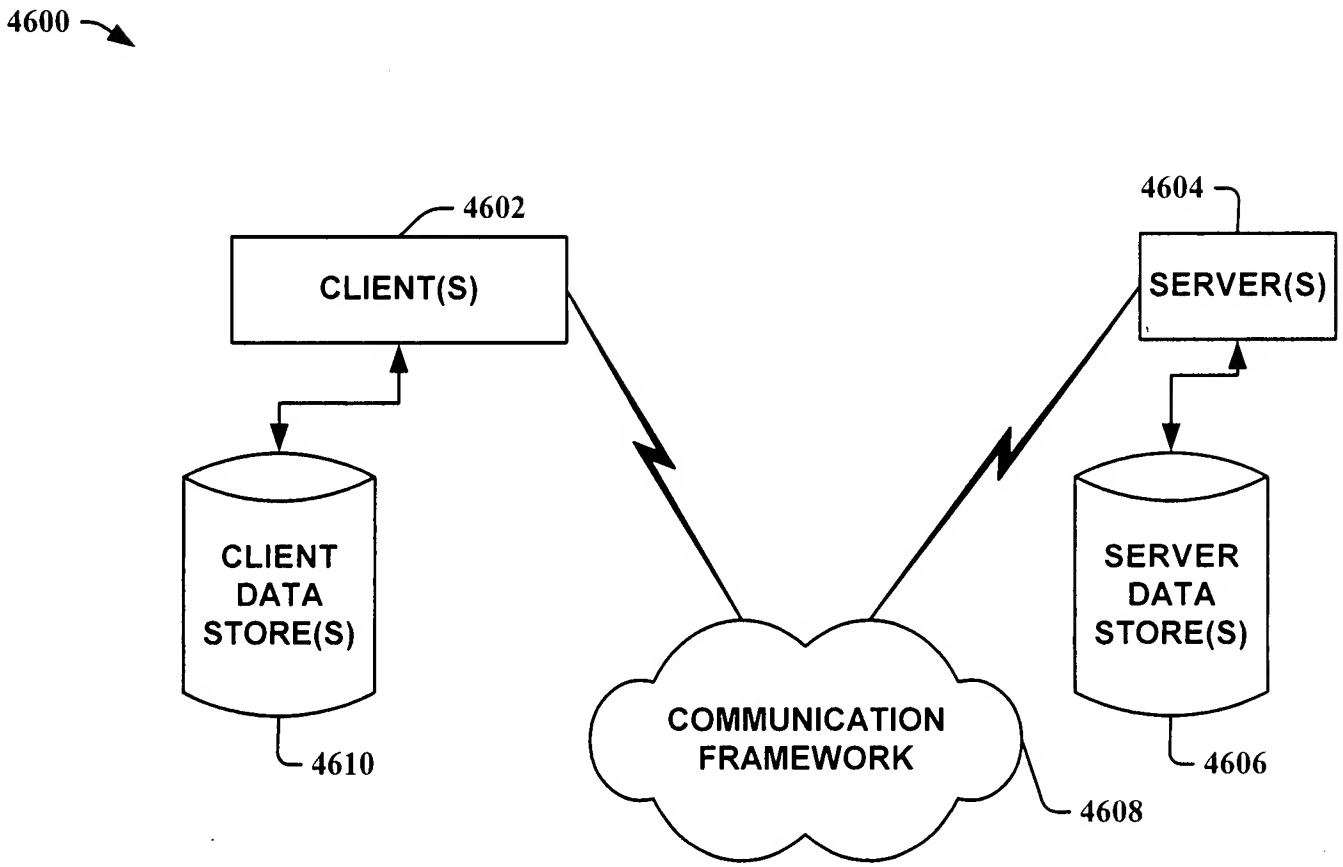

4600
4602
CLIENT(S)
4604
SERVER(S)
CLIENT DATA STORE(S)
4610
COMMUNICATION FRAMEWORK
4608
SERVER DATA STORE(S)
4606

FIG. 46